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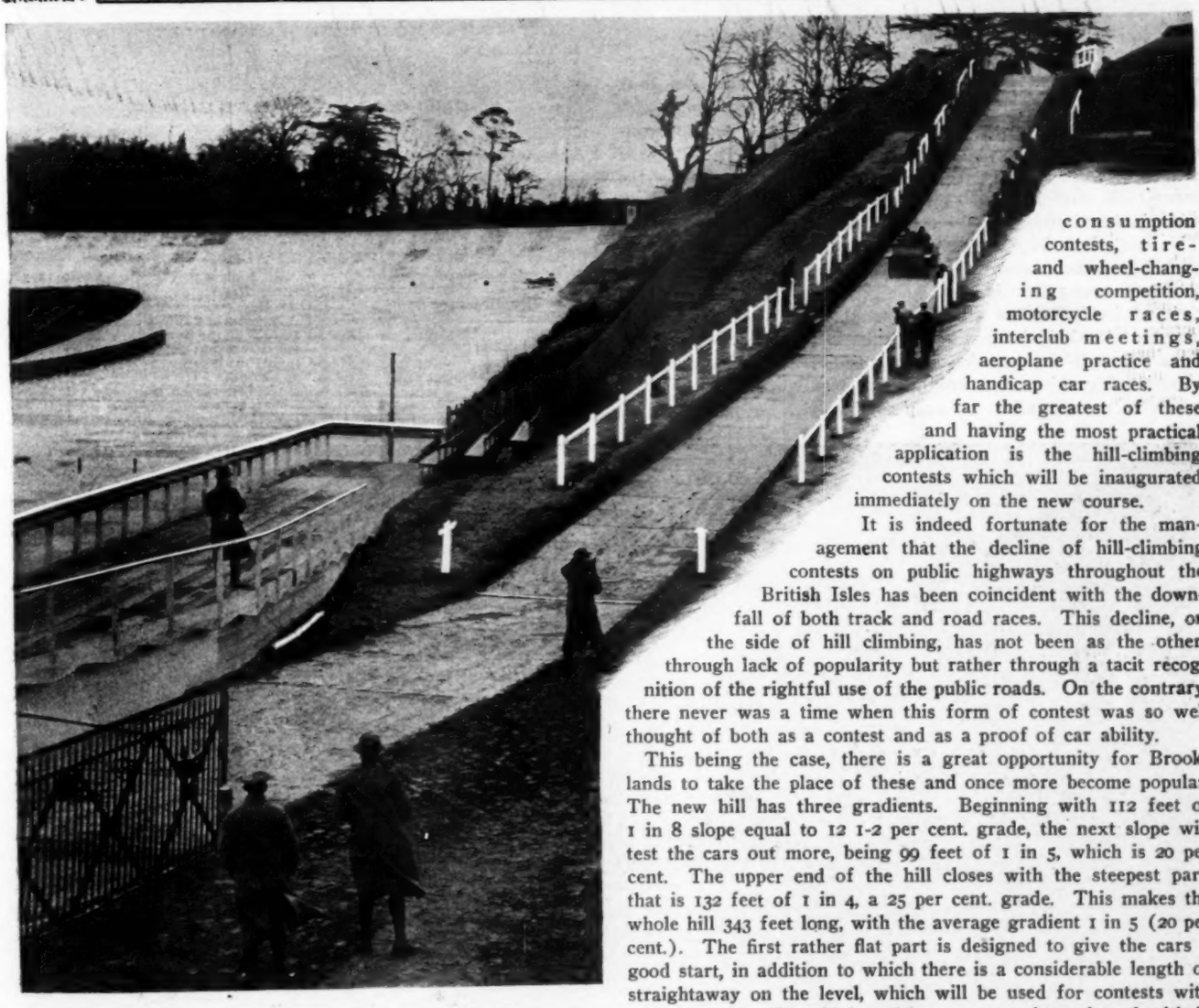
THE AUTOMOBILE

BROOKLANDS NOW HAS A HILL TO CLIMB



LONDON, April 2.—Brooklands, the famous English automobile race course, in which thousands of dollars have been invested, is making another important bid for support, which means another effort to insure some sort of return to the stockholders. A special course has been laid out up the hill in front of the clubhouse, and its already incessant use indicates its attractive value, especially to the man who drives his own car and wants to know what it can do actually.

There have been, and now are, many other plans for popularizing this great but unprofitable enterprise, including fuel-consumption contests, tire- and wheel-changing competition, motorcycle races, interclub meetings, aeroplane practice and handicap car races. By far the greatest of these and having the most practical application is the hill-climbing contests which will be inaugurated immediately on the new course.

It is indeed fortunate for the management that the decline of hill-climbing contests on public highways throughout the British Isles has been coincident with the downfall of both track and road races. This decline, on the side of hill climbing, has not been as the other, through lack of popularity but rather through a tacit recognition of the rightful use of the public roads. On the contrary, there never was a time when this form of contest was so well thought of both as a contest and as a proof of car ability.

This being the case, there is a great opportunity for Brooklands to take the place of these and once more become popular. The new hill has three gradients. Beginning with 112 feet of 1 in 8 slope equal to 12 1-2 per cent. grade, the next slope will test the cars out more, being 99 feet of 1 in 5, which is 20 per cent. The upper end of the hill closes with the steepest part, that is 132 feet of 1 in 4, a 25 per cent. grade. This makes the whole hill 343 feet long, with the average gradient 1 in 5 (20 per cent.). The first rather flat part is designed to give the cars a good start, in addition to which there is a considerable length of straightaway on the level, which will be used for contests with a flying start. Thus high and low gear can be reckoned with in contests.

Above the flat lower part of the grade increases as the upper end is approached until the final part is the steepest of all. Beyond the top there is a slight bend and then the course leads past the grand stand in the general direction of one of the bridges over the main track. All this allows of unlimited speed on the hill with prospects of being able to run beyond.

For testing purposes this will be ideal and the time will doubtless come when this famous place will lose its identity as a race

course and become the national testing grounds, all kinds of tests being provided instead of the single-speed opportunity of the past and the dual idea of speed and hill climbing of to-day. When this comes to pass certificates will probably be issued which set forth the ability of the car under test. According as the track management acts wisely or otherwisely these certificates will have a very real value. In fact, viewed in this light, it is not hard to imagine the average Englishman, ignorant of automobile mechanism, buying on basis of a Brooklands certificate.

The surface of the hill, like the main track, is of concrete about 6 inches thick. On either side are banks of turf 2 feet wide and about 3 feet high, on top of which is a hand rail some 2 feet high. This puts possible spectators quite a distance away from the track and far enough above the cars competing to counteract this. By this arrangement those looking on are in a position to see well without any danger to themselves should the railing give way. The width of the concrete surface is 12 feet, cambered at the center about 2 inches.

The timing arrangements provide for electrical timing at the foot and at the end of each strip of the hill so that total time and individual time on any one part may be taken.

The hill idea took hold very rapidly, only having been proposed the latter part of January. The manager of the track took to it at once, secured the necessary money and proceeded with the construction with all speed. The result is that the hill, conceived less than 10 weeks ago, is now a reality.

One of the minor problems of construction was to lay the concrete in such a manner as to prevent it from flowing both when laid and under the severe work which the use of it entails. This was effected by the use of very heavy cross timbers of oak, which were themselves set in concrete, the latter being in cross trenches some 3 feet deep. Above these timbers come the main ties and finally smaller wooden slats which act as spacers. The concrete foundations fill in between the ties and just cover them. Then there is the top dressing formed of very fine concrete with small granite chips imbedded in it to provide the "hold" necessary on a gradient as steep as this one.

STEAM SCORED BEST IN 'FRISCO CLIMB.

San Francisco, March 29.—The initial event of the San Francisco Motor Club, held yesterday, was a hill climb up what is known as Nineteenth Avenue Street Hill, which has a 6 per cent. grade. The course was a mile long, and the cars were sent away with a standing start. The event also brought out a new timing apparatus designed by a local autoist. This worked perfectly, and made it possible to pull off the whole programme in two hours. The record for the hill went to the White steamer, which climbed in 1:12 2/5.

The fastest time made by a gasoline car was that of the Comet, the California built car, which covered the mile in 1:15 1/5.

CARS COSTING $1,200 OR LESS.

1. Buick "White Streak"	Frank Murray	1:24 4-5
2. Mitchell	A. E. Hunter	1:35
3. Auburn	G. C. Murray	2:00 2-5

SPECIAL MATCH RACE BETWEEN $2,000 WHITE STEAMER AND $1,580 STODDARD-DAYTON.

0. White		1:12 2-5
0. Stoddard-Dayton		Did not finish

(Declared no contest by judges.)

CARS COSTING MORE THAN $1,800 AND LESS THAN $3,000.

1. Thomas "40"	I. L. de Jongh	1:21 2-5
2. Buick	C. S. Howard	1:25 2-5
3. Comet	Frank Free	1:26 1-5

CARS COSTING MORE THAN $3,000.

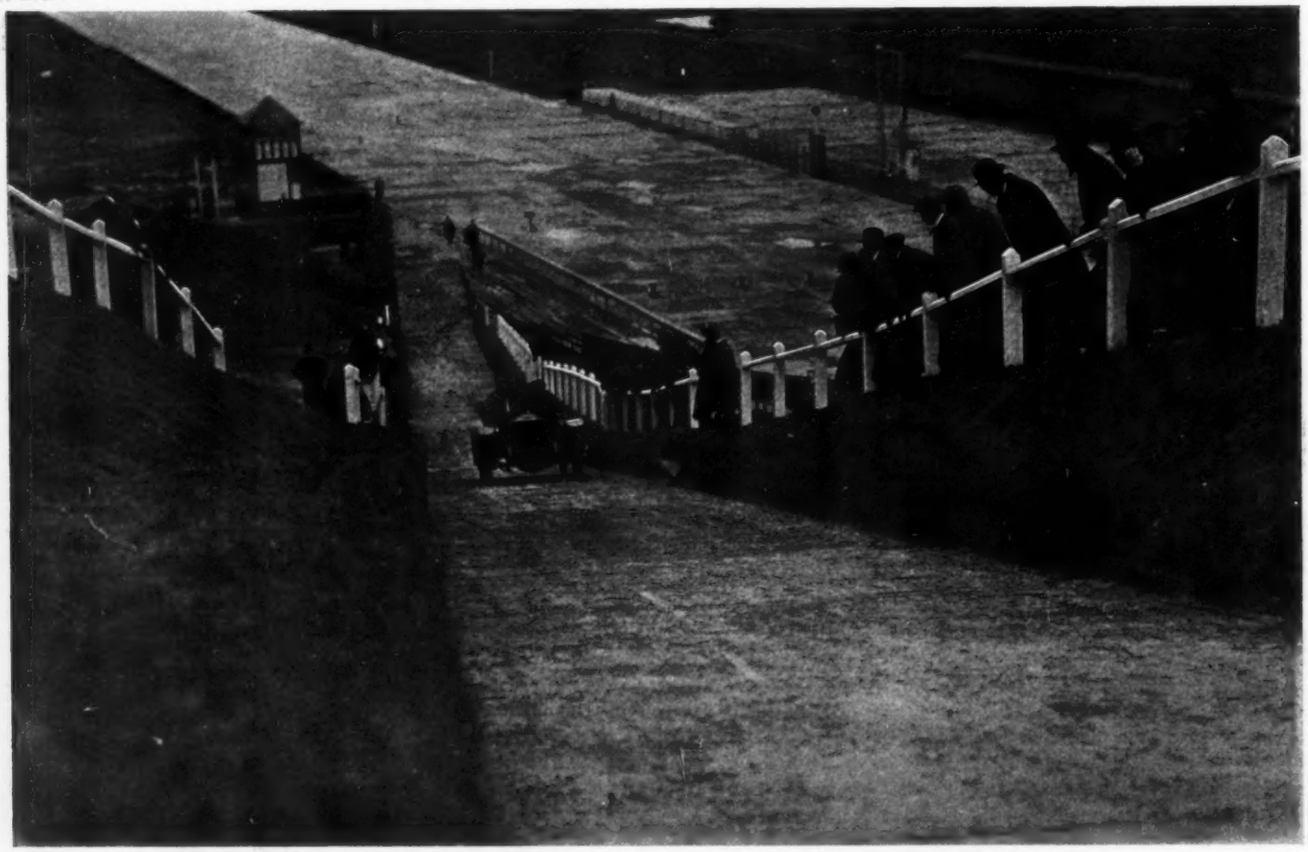
1. Stearns	D. A. Bonney	1:20
2. Pope-Hartford	Jack Fleming	1:20 2-5
3. Palmer & Singer	C. Onthank	1:23 3-5

CARS COSTING OVER $1,200 AND LESS THAN $1,800.

1. Stoddard-Dayton	Fred J. Wiseman	1:20
2. Oakland	W. W. McDonald	1:40 2-5
3. Overland	Bob Fowler	1:54 4-5

FREE-FOR-ALL.

1. Stanley Steamer	O. C. Joslyn	1:13 3-5
2. Comet	Frank Free	1:15 1-5
3. White Steamer	Gus Seyfried	1:16 1-5
4. Stearns	D. A. Bonney	1:18 1-5
5. Stoddard-Dayton	Fred Wiseman	1:19
6. Pope-Hartford	Jack Fleming	1:20
7. Palmer & Singer	C. Onthank	1:23 2-5
8. Acme "Six"	Fay Sheets	1:24 4-5
9. Buick	Frank Murray	1:25 3-5
10. Rambler	L. B. Harvey	1:31 3-5
11. Mitchell	A. E. Hunter	1:32 3-5



Looking Down from the Top of the Brooklands Hill During a Recent Private Test of Its Grades.

Indiana's Speedway Rapidly Becoming a Reality

INDIANAPOLIS, IND., April 5.—Active work in building the Indianapolis Motor Speedway has been commenced by the contractors and carpenters, and in a very short time it is expected that the fifty feet wide course will be completed. The contractor in charge of the grading has on the scene machines which gather and dump a wagon load of dirt every half minute, with the scrapers, scoops, rollers, traction engine, and wagons necessary to do the work. The track will be sixty feet wide on the banked turns. The carpenters are busy building the fence, and the buildings, and a uniform color scheme has been decided upon for their finish. A view of green, trimmed with white will greet the visitors next Summer. A club house and a two-story restaurant are expected to be completed by June 1.

There are 328 acres in the enclosure, and the first plan of having two courses, one within the other, the outside one three miles long, and the inside one two, giving a five-mile course by using them combined, has been changed. The new plans call for an outside track of two and a half miles with curves that will permit a speed of 105 to 112 miles an hour, and the inside course is the same length, so that together the five miles can be secured. Under the present arrangement the cars will pass the grand stand three times on one lap, and it will be possible to see all of the contestants all of the time, at any part of the course.

The Indianapolis Gas Company will soon have a pipe line laid to the space for filling balloons, and in ample time for practice for the international race of the Aero Club of America, which starts on June 5. G. L. Bumbaugh, aeronautical captain of the Aero Club of Indiana, returned from the West this week to accompany Indianapolis balloonists in their flights necessary to become pilots in the national club.

ST. LOUIS PLANS CONCRETE RACE COURSE.

ST. LOUIS, April 5.—A project to build a reinforced concrete automobile race course and balloon ascension grounds has been started by the Million Population Club of this city, and has made rapid and substantial progress. The track will be oval and two miles in length, with the ascension grounds in the center, and a grand stand will be erected to accommodate 10,000 people. The Missouri senators have become members, and a large number of wealthy men have joined in booming the plans.

NO WILBRAHAM CLIMB THIS SUMMER.

SPRINGFIELD, MASS., April 5.—The Automobile Club of Springfield has decided not to hold the Wilbraham mountain climb this year on account of the high expense incurred by the event. Last year it cost the members about $1,200, and it is the opinion here that the money could be spent better toward improving roads and in erecting signs. A committee has been appointed to inspect the road between Holyoke and Smith's Ferry and to report upon its condition, looking toward its reconstruction.

CAVALRY WILL GUARD LOOKOUT MOUNTAIN CLIMB

CHATTANOOGA, TENN., April 5.—So much interest has been taken in the hill climb which will be held by the Lookout Mountain Automobile Club, on Lookout Mountain, that it has been found necessary to make the affair of three days' duration instead of one, and perhaps the most important action in preparation for the event is the securing of Government troops to guard the course. Absolutely everything that can be thought of has been outlined and will be arranged.

The three days chosen are April 22, 23 and 24 and entry blanks have already been sent out to prominent manufacturers and dealers, there being eight races on the list, two free-for-alls, four for various classes of stock cars and two for motorcycles. Inasmuch as the hill is four and a half miles long and only a few cars will be allowed on it at a time and perhaps only one at a time, it will probably take some time to run off the eight events. It was this fact which influenced the club in setting three days for the festivities. While the troops have not been definitely secured, promises have been made to the club that the Government cavalry will be supplied, for there are a couple of thousand stationed at Fort Oglethorpe, Dodge, Ga.

Already work has commenced upon the course and a force of men is banking up the turns. The highway itself is a stone pike and needs little repairing. Owing to the frequent windings of the hill a system of block signal is being installed. The following is the list of events and prizes:

Event 1.—Free for all, no restriction as to weight, motive power or other construction. C. E. James Trophy.
Event 2.—Free for all stock cars. W. J. Oliver Trophy.
Event 3.—Stock cars listing at $4,000 and under. Hotel Patten Trophy.
Event 4.—Stock cars listing at $3,000 and under. Chamber of Commerce Trophy.
Event 5.—Stock cars listing at $2,000 and under. Manufacturer's Association Trophy.
Event 6.—Stock cars listing at $1,000 and under. Mountain City Club Trophy.
Event 7.—Motorcycle, up to 30 1-2-inch piston displacement. Chattanooga Automobile Club Trophy.
Event 8.—Motorcycle, up to 61-inch piston displacement. Lookout Mountain Automobile Club Trophy.

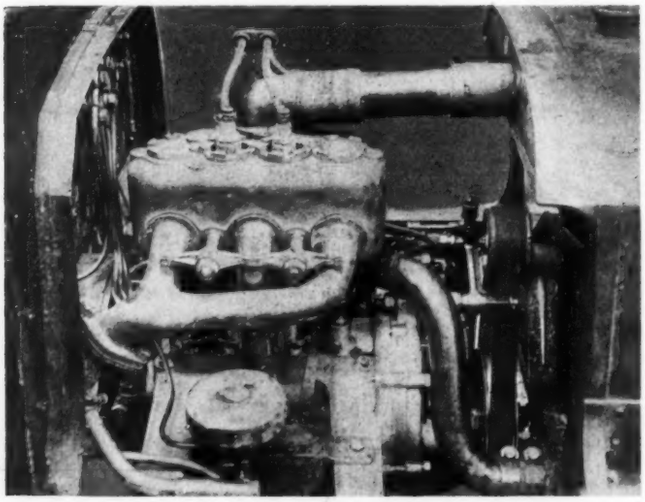
France Now Keen After Small Car Market

Panhard's Bid for the Small Car Business Shows Fine Proportions.

PARIS, April 1.—An epochal announcement has emanated from the big Panhard factory on Avenue d'Ivry, and the details of the new light car are now public. This is in the nature of a wide departure for the house of Panhard, in that it relates to the production of the first two-cylinder car brought out in the past ten years, the last one dating back to 1899. By many persons in a position to know, this is thought to be a bid for the small car market, now so much larger numerically than the big touring car business. This first impression is further strengthened by the announcement that this new chassis will be produced in very large numbers. An inspection of the lines of the chassis show that without alteration it will be available for taxicab use, which contingency was doubtlessly considered by the far-seeing engineers of the "Anciens Etablissements," and which swells the possible field greatly.

Whatever the intention, the fact remains that here is a little, light, low-powered car with Panhard materials and workmanship, built to sell at a low price. At least it is reasonable to assume that the price will be very close to its natural competitors of the same power, which would put it in the class of 6,000 francs or less. This would bring it into the United States at just under $1,800.

Inaugurates Many New Features for Panhard.—Despite the number of characteristic features, such as the shaft drive, live rear axle, Krebs carbureter, usual spring suspension, typical radiator, deep section pressed steel frame, long stroke motor and many other Panhard earmarks, there are also evident numerous new features of sterling worth. Thus, it has long been characteristic of this house to cast the cylinders individually and with valves on opposite sides. The new engine has these in pairs with integral water jacket, and valves placed side by side on the left. This allows the use of a single camshaft, simplifies the construction and cheapens it not a little.



Valve Side of the 8-horsepower Motor.

Following in their ordinary lines, the engine has a long stroke. The bore is 80 mm. (3.15 inches) by 120 mm. (4.72 inches) stroke, a ratio of 1 to 1.5. This size easily gives the rated 8 horsepower without unduly high piston speed; in fact, it would be the A. L. A. M. rating for this bore.

Thermo Siphon Cooling Adopted.—Another departure which also makes for simplicity is the abandonment of the pump. In thus approving the natural circulation of the water, the tendency of the times is concurred in by one of the most conservative firms in existence. The radiator is unchanged, but the water pipes are enlarged in size, bends are eliminated or made of a large radius, while their length is reduced to a minimum. The outlet is on top midway between the cylinders, and the water enters at the front side of the jacket at an angle.

A large diameter fan is placed between the engine and the radiator. This is cast as a unit, blades, hub and all. It is of aluminum and the blades are ribbed for strength on the under side. A wide belt drives from the pulley on the crankshaft so that the fan speed will be high. The fanshaft is hung on one end of a rocker, the other being spring retained in position. This arrangement is such that the spring automatically tightens the belt and keeps it tight.

Careful Yet Simple Piping Arrangement.—The exhaust valves are placed at the front and back of the motor. This brings the two inlets together in the center and allows a simplified inlet pipe without in any way complicating the exhaust header. The latter has been carefully studied out and is given a slight downward slope to the rear. The diameter is increased at the junction of the second part and the flange at the rear is set on a diagonal, which allows the pipe to be dropped as soon as the two bolts have been removed.

The inlet is very short and stubby, leading down to the Krebs carbureter, placed midway between the feet of the crank case. The pipe for the hot air supply is readily seen on the valve side.

Single ignition is fitted with a magneto as the source of current. The latter is placed crosswise of the motor in front of the forward foot of the case, and rather low down. But two plugs are provided, placed over the inlet valves. This makes the ignition system one of marked simplicity.

Lubrication Shows Simplicity, Too.—The lubrication has been worked out as carefully as any other feature, and while presenting few new ideas, is noticeable for its simplicity. An oil reservoir is placed between the crank case feet on the right side and has a capacity of sufficient oil to take the car 150 miles. The oil is forced by pressure to an indicator on the dash from which it flows to the various bearings and thence into the bottom of the case. Interior lubrication is by splash.

The engine is attached directly to the main frame, but the transmission is carried on a pair of cross members. The former is a departure from ordinary practice. The frame itself is of pressed steel of a very deep section and is narrowed in two directions. In front, the side members are brought close together to dispense with the usual engine sub-frame and also to allow of a big steering lock. At the rear this narrowing takes the form of an uplift or drop, as you chose to call it, which lowers the center of gravity, with plenty of clearance over the axle.

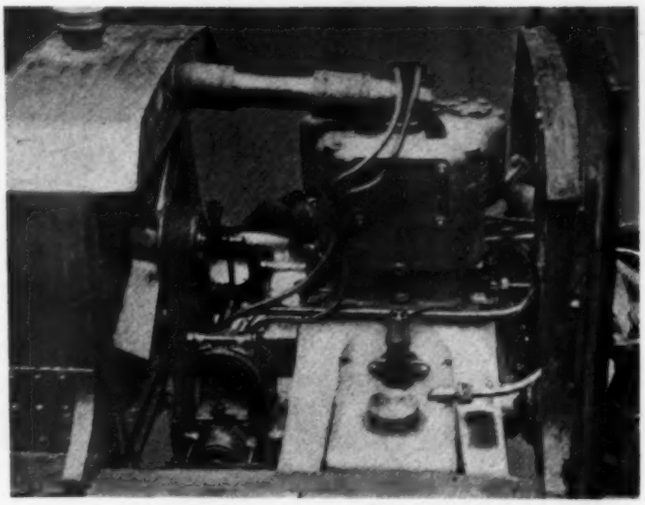
The spring suspension shows the same as other Panhard models of late years, viz., flat semi-elliptic springs in front, shackled at the rear end only, and three-quarter scroll elliptic at the rear attached directly to the frame at both ends. The forward end is attached through the medium of a dust proof joint which allows of slight rotation.

Radical Change in the Clutch.—From the engine, the drive is through the medium of a clutch, which shows a wide departure from past practice. Formerly the clutch used was of the multiple disc type and was carried in an extension of the gear-case. On this car the clutch is of the inverted cone type, leather lined. This is readily removable for the purpose of renewing the leather or adjusting the tension of the spring, the latter being placed between the flywheel and the cone. Thus it is hidden from view, but this procedure has the virtue of also keeping out all dust and dirt.

The gear box provides three speeds and reverse, operating on the selective principle. The gears are of large diameter, with wide face and coarse module pitch. They are operated by the usual hand lever, which is the inner one of the two.

The control is by means of foot accelerator and throttle lever only, the spark advance being fixed. There are two pedals, the right one being connected to the brake on the driving shaft back of the transmission. The other is the usual clutch pedal.

Between the clutch and the transmission is a split shaft coupling with a square hole, a squared shaft working within this, and thus allowing the ready removal of either the clutch or transmission without disturbing the other.



How the Magneto Is Placed on the Motor.

The transmission shafts all run on ball bearings, but the engine bearings are plain. The balls are liberally used throughout the car on wheels and other parts.

Between the transmission and the rear axle carrying the differential case, the cardan shaft has two universal joints, one at each end. The differential case shows a bold stroke in the utilization of aluminum, this being a place where steel is ordinarily used. This is riveted to the steel tubes which carry the weight of the car and to which the springs are attached.

Ball Bearing Wheels Are Carried by Tubes.—The rear wheels, which are upon ball bearings, are carried by the tube within which the shaft proper does the driving by means of clutches at the outer ends. These allow some freedom of motion and in this way the axle neither carries any weight nor receives any of the destructive road shocks.

A BRIEF HISTORY OF THE HOUSE OF RENAULT

PARIS, April 1.—The union of the Renault Frères has been broken by the death of Fernand Renault, eldest of the three brothers who at one time formed the world-famed firm of automobile constructors. An attack of cancer, aggravated by the decomposition of the blood, brought about the end of Fernand Renault at the age of 44 and at a moment when he was about to enjoy the fruits of his rapidly earned fortune.

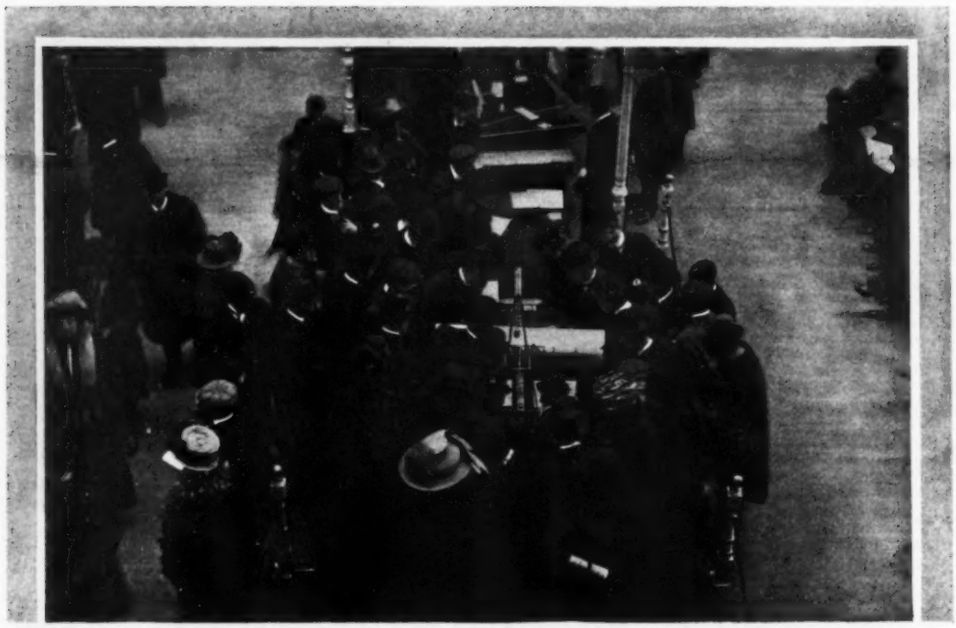
Fernand Renault was only introduced to the automobile industry through his brother Louis, who now remains at the head of the huge factory on the banks of the River Seine. The three brothers, Fernand, Marcel and Louis, were all destined by their father to succeed him in a wholesale linen drapery establishment on the Place des Victoires, Paris. Louis rebelled at the idea of passing his life behind a counter, and at 19 years of age quit his father's establishment to enter the Delaunay-Belleville firm as a draughtsman. At that time the automobile hardly existed, even in France, and was altogether unknown at the Delaunay-Belleville shops. Being interested in the budding method of road locomotion, Louis Renault applied to Panhard-Levassor for a position as a draughtsman, and was bluntly refused by Levassor with the remark that "No amateurs were wanted."

The amateur returned home, appealed to his mother for a small workshop adjoining the family dwelling at Billancourt and began the construction of automobiles. His first machine embodied the principle of direct drive by cardan shaft and revealed to the world that a master mind had tackled the problem of the automobile. Success in speed contests came as early as 1899, when the little vehicles, driven by 2 3-4-horse-power De Dion motors, won practically all the events of the year.

Marcel Renault soon threw down the tape measure and ran to assist his brother in the new industry. It was not an important industry at that time, for when the firm was constituted in 1898 the number of workmen employed was six, the factory area about 350 square yards, and the annual production six small cars. Louis Renault was responsible for the engineering branch of the industry, while his brother Marcel took charge of the commercial end and drove the small cars in all races. This continued until 1903, when in the ill-fated Paris-Madrid race Marcel Renault met his death, and his elder brother Fernand took full control of the commercial end of the factory.

A 10 years' contract of partnership between Fernand and Louis Renault expired last December. The elder brother, feeling that his health was not satisfactory, decided not to renew the agreement, but for the rest of his life to enjoy the fruits of his toil. At 43 years of age he was wealthy, decorated with the Legion of Honor and apparently destined to a long life. At the end of last year, therefore, he quit the factory, which had grown from an area of 350 square yards to nearly 60,000 square yards, from an output of 6 cars to 5,000 per annum, and from a staff of 6 to an army of 2,600 workmen regularly employed.

At 32 years of age "Monsieur Louis," as he is familiarly called at the factory, remained at the head of the works he had created alone 11 years before. A few months later and death ratified the dissolution of the partnership by the remvoal of the elder brother Fernand. Now Renault Frères has become Louis Renault, and one of the world's most important automobile factories is controlled by a young man whose success has been phenomenal, but to whom fate has been cruel.



Britain Intently Studies Aerial Flight Progress

By Joseph A. Mackle

LONDON, April 1.—The exhibition of flying machines and their accessories, organized by the Society of Motor Manufacturers and Traders, and which opened its doors at Olympia on March 19, has already proved a gratifying success. Right from the first there has been evident a keen interest on the part of the public, while representatives of the military and naval authorities, together with many of the foreign atttachés, have been devoting considerable time to a detailed study of the exhibits. This afternoon the Prince of Wales paid an extended visit and, altogether, these marks of distinguished favor and interest cannot but have a stimulating effect on the progress of aviation in this country.

As an exhibition the present collection is generally admitted to be quite as imposing as the earlier Paris Salon, for while the number of machines is somewhat less, the French show suffered from the scattered nature of its exhibits, due to the commercial vehicles.

Wright Among Absentees.

The collection of full-sized machines numbers 11, compared with 16 at Paris. The absentees comprise the Bleriot and Antoinette monoplanes, the Clement dirigible, several of lesser importance, but also—and its non-appearance is the cause of much disappointment—the Wright flyer. Fortunately there is a large scale model of this machine included in the excellent and extensive collection of models which occupies several stands in the center of the building. This section was specially organized by the Aero Club, under whose auspices also the show is being held, and it serves well to demonstrate to the public the construction and differences of the various machines in a much clearer way than is possible with the full-sized and more cumbrous flyers.

The engine and accessory sections are likewise fully representative. The special lightweight motors of the French makers, such as the R. E. P. and the Guome, are staged along with the more substantial Belgian productions of E. N. V., Vivinus and Metallurgique. There are also many creditable productions of British firms who have for the most part favored reliability and endurance rather than extreme lightness of weight.

To deal with the full-sized machines first of all, the center of attraction, doubtless on account of its size and central position, is the Wellman airship, designed for the Wellman Arctic expedition by Melvin Vanniman, who is busily in attendance. To-day's report of the almost complete success of Lieutenant Shackelton's expedition to the South Pole, doubtless greatly assisted by his motor-propelled sledges, has caused even greater interest than before to be shown in this Wellman dirigible, with which an attempt will be made to reach the North Pole late this year.

Voisin Biplane Shown in Several Examples.

Three examples of the Voisin biplane are shown. F. R. Simms, as sole concessionaire, exhibits the standard Voisin machine, which has undergone no change in design. The engine, however, is the production of the Simms Works and is of the V type with six cylinders rated at 50 horsepower. The second example is the actual machine with which Moore Bra-

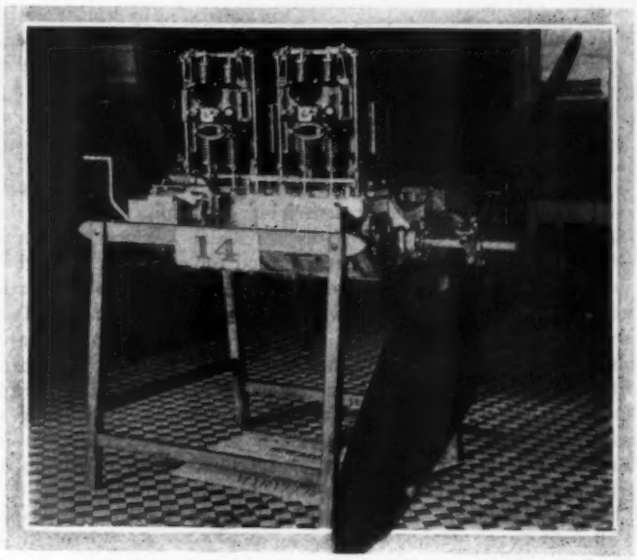
Taxicabs Outside the Aero Show, at Olympia, London. Note Spare Wheel Carried.

bazon has flown at Issy with such success. In this the distance between the main planes has been increased to 2 meters from the 1.5 meters, which is the figure for the standard machines. "The Bird of Passage," as it is styled, is equipped with an eight-cylinder E. N. V. engine of 65 horsepower, driving a twin-bladed propellor direct at 1,000 revolutions per minute. After the close of the exhibition this machine will be flown in this country at a place of favorable location.

The third Voisin is also a modification of the standard machine and is now known as the Delagrange biplane. The usual four vertical planes joining the main surfaces are absent in this machine and as they were dispensed with by Delagrange himself after his original flights, it is to be presumed that no loss of stability results. The engine is an eight-cylinder Antoinette of 55 horsepower and of the regular Antoinette design.

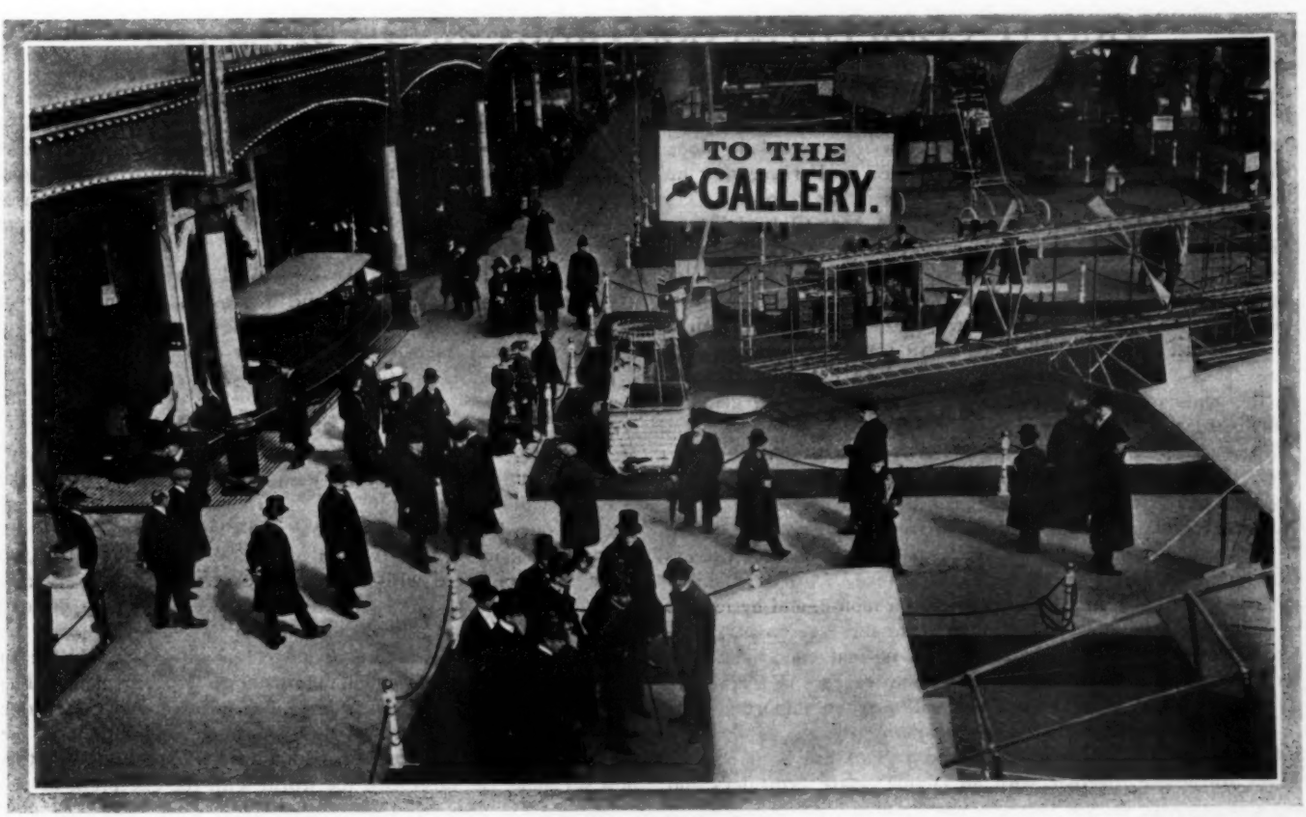
The "Short" Wright Machine Is Tailless.

The first of the British machines is shown by Short Brothers, the well-known balloon manufacturers, who are also building the Wilbur Wright biplanes (named thus in full to distinguish from the British Howard Wright machines) for the British concessionaires, Jarrott and Letts. The Short machine is not completed, but sufficient of it is on view to indicate the apparent soundness of its principles—a tribute which cannot be paid to several of the full-sized machines and many of the models elsewhere in the exhibition. It is a biplane, but of the "tailless" rather than of the Voisin type. The machine has also no outstanding rudder, steering being effected by means of four interconnected rudders, arranged in pairs just behind the extremities of the main planes. Where these rudders are situated the main planes are broadened out fore and aft and the lips thus formed can be flexed in opposite directions to control the lateral stability. Propulsion will be effected by an eight-cylinder V type British engine of 60 horsepower driving two rear propellors by chains. The machine is constructed of wood throughout and is a flexible rather than a rigid structure. The trials of this machine, to be held in a few weeks, are looked forward to with more than usual interest.



Four-Cylinder, 50-HP. Metallurgique Aero Engine.

The Howard Wright machine, on the other hand, is constructed of steel tubing throughout, the main members having a circular section, while the vertical struts are pear-shaped, to lessen wind resistance. All joints are rigid and have been welded by the oxy-acetylene process. The Voisin machine has been followed in its main lines, but the front elevator is of the biplane type and the main planes have small flexible silerons at the extreme rear corners. Interesting is the arrangement of the chassis on four wheels, diamond fashion, the idea being that the aviator may first drive over the ground until he has become accustomed to the machine. Motive power is supplied by a 50-horsepower four-cylinder Metallurgique engine driving a novel arrangement of a pair of two-bladed propellors in tandem



The Prince of Wales at the Olympic Aero Show, Examining Capt. Windham's Biplane.

at the rear. These two propellers are connected by a differential gear and revolve in opposite directions at one-third of the engine speed. The front propeller is somewhat larger in diameter than that at the rear. It will be interesting to note results.

Bregnet Biplane Has Been Changed Since the Salon.

The Bregnet biplane is quite distinct from the machine of this name exhibited at Paris, which was a combination of helicopter and biplane. The present biplane machine is unusual in having no surface forward of the main planes which are themselves mounted so that they can be tilted for elevating and righting purposes. A set of large planes comes in the rear, three above and one below, with two vertical rudders between. The structure is built up of large steel tubes and the members are so jointed that the machine can be easily folded up for transport. Continental fabric is used for the plane surfaces and a novel feature is the strengthening of all the forward or cutting edges with sheet aluminium. The engine is a 75-horsepower Gobron Brillie with the four cylinders arranged X fashion, driving a tractor screw in front—another novel feature for a biplane.

Captain Windham, the founder of the new British Aeroplane Club, shows a biplane machine of his own design built by Pischoff, of Paris. Between the two main planes are small righting planes operated by a movement of the operator's body. A rigid wooden framework connects the main planes with the rear elevating planes, which are almost as large as the main surfaces. The elevators and rudder are controlled by a double movement of a single lever, as in the Wilbur Wright machine. A four-cylinder Dutheil-Chalmers engine is fitted and this drives a single rear screw.

Monoplanes are represented by the R. E. P. and the Weiss, the more successful Bleriot and Antoinette machines being absent. The R. E. P. has been made in England and differs in no way from the one shown in Paris. The Weiss is a more novel production, and, like the Avions of Ader, closely follows bird form. The long monoplane surface has a cane and bamboo framework. No tail is fitted, but two small planes are let into the rear edges of the main wings. These planes are operated by pedals and are so controlled that they may be used together, to rise and fall and in opposition, for steering and righting. Two rear propellers are chain driven by an eight-cylinder engine.

De La Hault Ornithopter Is a Curiosity.

Two very curious machines complete the list. The De La Hault ornithopter consists of a light upright framework with a pair of fabric-covered blades or paddles connected through a system of gearing to the engine, which is at the bottom of the frame with its crankshaft vertical. The gearing causes the paddles to give an alternate downward beat followed by a feathering motion on the upward stroke. The machine is said to have raised itself vertically from the ground, but a separate means of propulsion would be required for horizontal motion.

Finally the Lamplough machine is quite novel. The main sustaining planes are of the biplane type and in addition there are four longitudinal central planes arranged in pairs. These planes have a rocking movement imparted to them by a link motion. In addition to this rocking motion about the hinges on top of the supporting columns the columns themselves undergo a separate rocking motion so that the planes trace out a figure of eight each cycle with a feathering motion on each up stroke. Apart from this lifting device and the main sustaining biplanes, there are the rear elevating planes and rudders. A separate motor will operate two propelling screws in the rear. These, however, have not yet been fitted. The idea embodied in this machine is entirely novel and its development merits attention.

The present show was undertaken as an educative step and hence the absence of much business will not cause disappointment. Late reports indicate many good inquiries and a moderate amount of sales have been booked by the accessory and engine-makers and to a limited degree by the exhibitors of the Voisin types of machine. It is interesting to note that almost every exhibitor offers to guarantee a set performance for his machine. Usually this is limited to a two-mile flight, but even this much proves the makers' belief in their flyers.

WRIGHT COMPLETES CONTRACT AND PUPILS FLY

PARIS, April 1.—Wilbur Wright has completed his contract with the Lazare Weiller committee by the formation of three pupils capable of handling the American aeroplane alone. This week the pilot left Pau and returned to Paris, giving his pupils before leaving the right to beat any of his records. They were satisfied to commence by winning the Aero Club of France prizes for a flight of not less than 250 meters. Paul Tissandier first mounted the machine and in a few minutes had won the beginners' prize. Pleased with this, he was off again a few minutes later and when he settled down again had made 10 rounds of the course, or a total distance of 18 1-2 miles, in the official time of 27 minutes 59 seconds. Comte de Lambert followed on the same machine, won the 250 meters prize, then also accomplished 10 rounds; time, 27 minutes 11 seconds.

The success of the pupils shows how ill-founded are the reports that the Wright aeroplane can only be handled by professional acrobats after a long training. Of the three pupils only Paul Tissandier is a skilled sportsman, and not one of the trio is such an apt pupil as a score of automobile race drivers who might have been selected. Yet with men of ordinary ability it has been possible in a little more than a month, and by lessons of only a few minutes' duration, to form three aeronauts capable of handling the machine under all normal conditions. As the three pupils are now about to become teachers in their turn, it is certain that Wright machines will play an important part in European aeroplane races this year.

One of the Wright aeroplanes used at Pau has been shipped direct for Rome together with an engine, spare propellers and all accessories. Wilbur Wright has returned direct to Paris, while his brother and sister have stopped at Le Mans on their way to the capital in order to visit the ground rendered famous by last year's flights. The two brothers and their sister will be in Rome early in the month of April, when Wilbur will make demonstrations before the Italian authorities for a fortnight. After this it is believed that a return will be made to America to complete the army contract interrupted by the accident to Orville Wright.

Just before leaving Pau the King of England paid a visit to the American aeronaut's camp and was given an opportunity of watching the machine at work. Orville Wright undertook to explain the mechanism of the aeroplane and King Edward did not fail to congratulate the brothers on their skill as flyers.

Clement Will Build a Much Greater Airship.

PARIS, April 1.—Adolphe Clement, pioneer automobile manufacturer, having sold his aerial yacht the *Bayard-Clement* to the Russian Government, has given orders for the construction of another one, larger and more powerful than the first. The new Bayard-Clement dirigible balloon will have a capacity of 212,000 cubic feet, compared with 123,000 cubic feet of the present airship. Its length and diameter have not been definitely decided upon, but an idea of its dimensions can be gathered from the fact that an airship garage is about to be built 330 feet in length and 88 feet in height—equal to an eight-story tenement. The balloon will be equipped with two independent engines, each one capable of driving the vessel under normal conditions, and the two together making possible a high rate of speed. With this new dirigible, the largest in the world with the exception of the Zeppelin, it is declared that voyages from Paris to London or Paris to Brussels and return will be quite possible.

AUTOMOBILE GASOLINE INVOLVES COMPLEX PROBLEMS

By Thos. J. Fay

GASOLINE, as the name of the liquid fuel used in automobiles, is a misnomer, in view of the practice in which all the fractions of the distallate, between 125 and 200 degrees Fahrenheit, are used in the mixture, whereas gasoline proper is a closely limited distillate, which comes off between 140 and 158 degrees Fahrenheit. Gasoline, as it is used in internal combustion motors, as they apply to automobile work, holds enough of the more volatile fractions to assure that the motor can be started cold, and if the means for heating are adequate the whole content of the fuel is burned in the process to more or less completeness, with a certain amount of carbon deposited in the combustion chamber, as evidence of any incomplete combustion.

The right name of this liquid fuel, in view of the number of fractions included, is "automobile gasoline," or automobile fuel, and that the fuel will take on many phases in the course of time is proven by the wide range of mixtures thus far used, with fair success, despite the trouble experienced in many attempts to use kerosene oil. True, kerosene oil has been and is used to-day, and the process is attended with good success in the field of its activities. Confining the discussion, however, to automobile work, it is certain that the day has passed when kerosene oil holds forth any further attractions, and what now presents itself is more by way of an adjustment of the details to suit the conditions as they really are.

When, in the early days of the automobile, gasoline (in fact) was used, the average autoist provided himself with a hydrometer, and when the gasoline failed to come up to a fitting standard it was easy enough to put some of the suspected liquid in a test tube, as shown in Fig. 1, and if the test indicated that the specific gravity of the liquid was in the neighborhood of 0.67, the conclusion reached was affirmative. The test was quite accurate, in the main, although it must be remembered that the hydrometer would not distinguish as between gasoline and some other liquid of the same density.

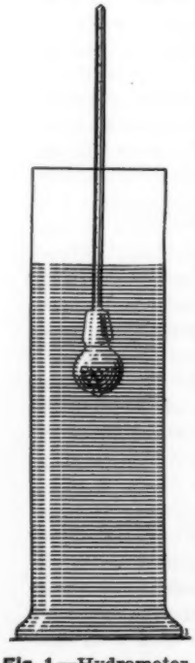


Fig. 1.—Hydrometer in single liquid.

That the test would not disclose the presence of water should have been well understood, since, as Fig. 3 shows, the water would settle to the bottom, and the hydrometer could not very well be at two levels at one time. True, the illustration is a little exaggerated, in that more water is indicated than the amount that would be sold for gasoline even by a merchant of "accentuated oil acumen." Incidentally, this same illustration will help in the process of reaching the conclusion why the hydrometer measurement is of no avail at the present time.

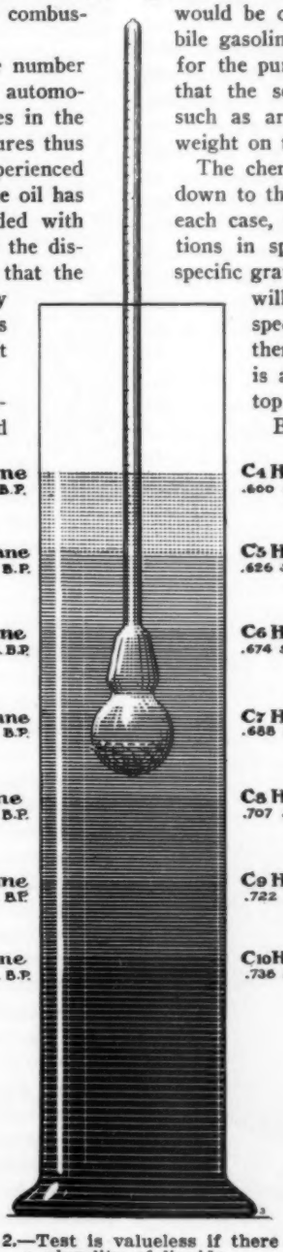


Fig. 2.—Test is valueless if there is a plurality of liquids.

Automobile Gasoline Is a Composite Product.—If it is admitted that oil and water cannot be tested by means of a hydrometer, in the manner as shown in Fig. 3, with a view to determining the specific gravity of the whole, a mere glance at Fig. 2 will be enough to "let the cat out of the bag" when it comes to the testing of present-day automobile gasoline, with a view to determining as to its composition, through the readings from a hydrometer. If water and gasoline cannot be tested, as in Fig. 3, in which there are but two liquids, what a small chance there would be of testing the complex liquid fuel called automobile gasoline in a test tube, using a hydrometer of any sort for the purpose! Referring to Fig. 2, it will be to observe that the several fractional distillates of hydrocarbon oils, such as are almost invariably found in gasoline, differ in weight on the one hand and in volatility on the other.

The chemical formulæ of the respective fractions are set down to the right of the test tube, under which formulæ, in each case, will be found the density of the respective fractions in specific gravity, as, for illustration, $C_4 H_{10}$ has a specific gravity (S. G.) of 0.600. On the left side of the tube will be found the customary name given to the respective fractions, and under the name of each of them the boiling point (B. P.) in degrees centigrade is also set down, as, for illustration, Butane (at the top of the list) boils at one degree centigrade.

By no stretch of the imagination can one reach the conclusion that a hydrometer will be of the slightest value in any attempt to determine the composition of a mixture of this character, nor would agitating the mixture help out, so that the license here taken, resulting in a display of the several fractions of the crude oil as lamanæ, is in no way to the detriment of accuracy, in this attempt to illustrate the point to be made.

The List of Contents Is Far from Complete.—Besides the seven fractions listed alongside of the test tube, Fig. 2, there is a long list of hydrocarbon compounds that can be and are used in automobile gasoline, to an extent not easy to predict. Some of the remaining fractions, not all of the same school, are as follows:

Hexahydrobenzine ..$C_6 H_{12}$,
S. G. 0.760, B. P. 69 deg. C.
Hexahydrotoulene...$C_7 H_{12}$,
S. G. 0.772, B. P. 97 deg. C.
Benzine .....$C_6 H_6$,
S G. 0.884, B. P. 80.4 deg. C.
Toulene.....$C_7 H_8$,
S. G. 0.871, B. P. 111 deg. C.

NOTE. — S. G. = specific gravity, and B. P. = boiling.

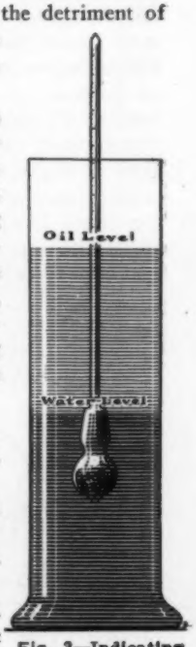


Fig. 3—Indicating futility of test.

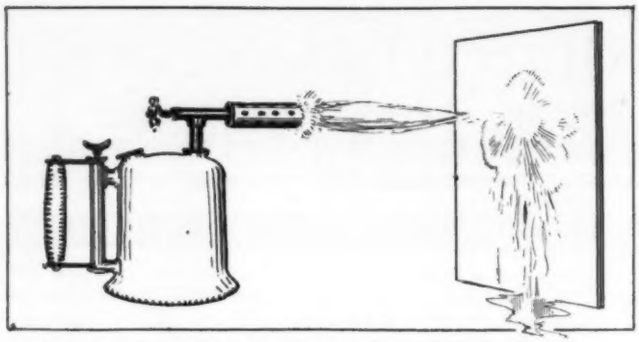


Fig. 4.—Heavy distillates will not burn and will pass over.

No mention has been made of alcohol, of which there are two classes, i. e., (a) methyl (wood spirits), and (b) ethyl (grain) alcohol. Of the alcohol products, it is assured that the only reason why they are not mixed up in automobile gasoline is because the market for alcohol is such as to render the same higher in price than the price which the other contents command at the present time, with small chance of any immediate improvement, considering present commercial conditions.

Let it not be supposed that the distillates, as mentioned, represent even a fair share of all the possible products of the paraffine, or other series, from which volatile hydrocarbon liquids are derived. Nor is it the purpose, at this time, to go into the question, at any further length than to point out the small chance any motorist would have in any attempt to determine as to the quality of the liquid fuel, such as might be purchased for his automobile, putting dependence upon a hydrometer, or, for that matter, any crude means, ready to hand. Of the distillates set down alongside of the test tube, Fig. 2, all are of the paraffine series excepting octane (which is from the methane series), and all are found in gasoline, as a rule, referring, of course, to the product to be had for automobiles.

Some Peculiarities of Automobile Gasoline.—If the several distillates that go to compose a given liquid have not the same boiling point, it requires no stretch of the imagination to see wherein trouble can arise if the conditions are not suited to the difficulties. Fig. 4 is of a simple gasoline torch, such as should be in the repair kit of every autoist, and if this same torch is filled with gasoline out of the tank of the automobile it will enable the autoist to see for himself that the mixture is not with a common boiling point for all the contents, for, if the torch is lighted, and if the flame is directed at a plate (a sheet of steel serves well), some of the gasoline will burn, and the balance will pass through the flame and impinge on the surface of the plate, resulting in a pool of the heavier portions of the fuel, on the ground, under the plate.

What does this show? First, that all the fuel is not of the same volatility, and again that the part that has the highest boiling point must be allowed the most time in which to burn. But if the available interval is the same, as it must be, for all the fractions in the automobile gasoline, there is plenty of room for speculation, and there is need for one of two things, i. e., (a) either the fuel must be adapted to the work to be done, or (b) the means for the use of the fuel must take into account the complex nature of the same, and the difficulties involved.

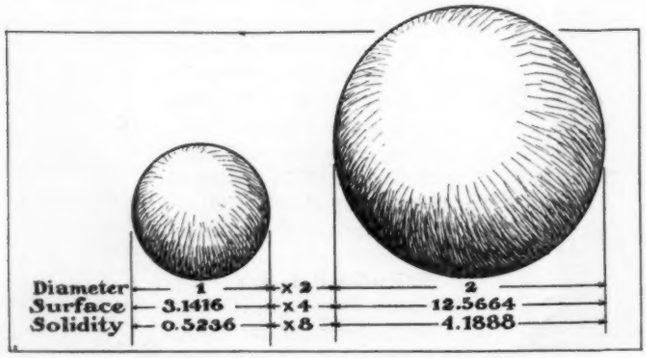


Fig. 5.—Spheres used to illustrate the effects of gasoline.

Gasoline Streams from the Nozzle of Carbureters.—When the piston in the cylinder of a motor displaces atmosphere, due to the travel of the piston, a partial vacuum is formed in the intake manifold, and because of the difference in pressure between the outside atmosphere and the partial vacuum in the "depression chamber" of the carbureter, gasoline is sucked out of the floatbowl, through the nozzle, into the depression chamber, in a stream, just as water is projected from a nozzle of a fire hose, and in the case of the gasoline, after it lands in the depression chamber of the carbureter, it is picked up by the current of in-rushing air and carried away, in globule formation, in route to the cylinders of the motor.

When these globules are very fine, and the air is well saturated with them, the product is not unlike a "fog," and if all the globules are of the same size, provided they are of microscopic dimensions, the resultant mixture will be good for the purpose, since it will vaporize and then burn, as a sequence, hence the motor will deliver power on a basis indicating that it is a homogeneous gas that is entering the cylinders. Unfortunately, the globules cannot be all of the same size unless all of the liquid is of the same character, so that it will be well to take a look at this phase of the subject and ascertain what will be the normal expectation under such conditions. Fig. 5 represents two spheres alongside of each other, so placed in order to point out the physical properties of spheres of different diameters, it being true that globules of gasoline are as spheres, and for the purpose in hand it matters not at all if the globules are very small, since we are dealing with relative sizes only, in actual practice.

If the two spheres are of one and two diameters, respectively, the surface of the large one will have four times the surface area of the small one, but, unfortunately (in this case), the solidity of the large sphere will be eight times the solidity of the small one. How, in the name of common sense, can eight times a given mass of gasoline vaporize in a given time if the surface is only four times as much? The exchange of heat is necessary in order to vaporize any liquid; to this rule gasoline is no exception, and since heat transfers, (a) in proportion to the surface, and (b) as the difference in temperature. It will require double the time to vaporize globules of double size, when, as a matter of fact, the time allowed is the same for all globule formations in practice, with the result that the larger, and the less volatile globules, enter the cylinders before they vaporize.

Gasoline Is Coked in the Cylinders.—Having traced the liquid gasoline into the cylinders, in which form we know it cannot be made to burn without first being vaporized, the next question is, what is the disadvantage? If wood is put on a stove, and if the drafts are opened sufficiently, the wood will be burned, and the remaining residuum will be ashes. If the wood is put into a sealed chamber *D*, as shown in Fig. 5, and provided a fire is maintained in the grate *E*, if the chamber *D* is sealed, so that air cannot enter through the door *C*, the wood so placed will be reduced to charcoal. If coal is put in the same chamber instead of wood, the product of the destructive distillation (for such it is) will be coke. In this case the fuel burned in the grate *E* is fired through the door *A*, and the ashes will collect in the pit *F*, while the gaseous products will go up the flue *G*. In this same process then we see that fuel is burned if it is allowed to assemble in the presence of its quota of oxygen, which it takes from the air, while it is "coked" if the air (in which oxygen abounds) is choked off.

Since gasoline is composed of carbon and hydrogen, if it is heated sufficiently, under suitable conditions, it too will form coke out of the carbon, and the hydrogen will be driven off. Fig. 7 shows a cylinder of a motor, in which it will be seen that coke *C* has collected in the combustion chamber, above the piston *B*, inside of the walls *A*. Since we know that a carbon crust does form in motor cylinders, it is not necessary to argue

as to the facts, but it is desired to find the reasons for the formation, in order that a remedy can be applied. It takes a little time to reach the conclusion that the process is precisely that which the old charcoal burner has used, for ages back, but, having evolved the idea, it will take more time to get rid of it, unless a means can be found by which liquid gasoline, of the complex mixture now in vogue, can be vaporized before it enters the cylinders.

It might be said that the gasoline burned in the cylinder of a motor is in the presence of atmospheric air, and on this account it should not be reduced to coke. But it is reduced, as is too well known to require further proof, and the reason why the air that enters the cylinder does not prevent the formation of this same coke is due to the mixture of the air with so much readily inflammable vapor of gasoline that the globules of less volatile liquid are not in shape to rob the fine vapor of its oxygen, even though there may be an excess of oxygen present. Further study of the spheres, as shown in Fig. 5, will aid in the process of reasoning, especially if account be taken of the short time allowed the gasoline to do its work.

Comparison of Carbon Deposit to Coke Not Far-fetched.—An examination in detail of the two products of combustion shows that the comparison is not a far-fetched one. The coal is purposely deprived of air in order that coke may result. The gasoline, deprived of its air, either purposely or otherwise, cannot help but produce the despised carbon residue. Not only are the processes by which they are formed very similar, but the physical and chemical forms of the two are very much alike. Coke is hard, brittle, porous and has a metallic luster. Carbon cylinder deposits are hard, brittle, porous but less so than coke, and have a metallic luster. The former is insoluble in any known liquid; so, too, is the carbon, which lack of air leaves on top of the piston. To dispose of an accumulation of coke it is crushed, being brittle, and washed or swept away. Similarly, to get rid of carbon, it is broken up and then blown out of the cylinder, or it may be combined with oxygen from decarbonizers.

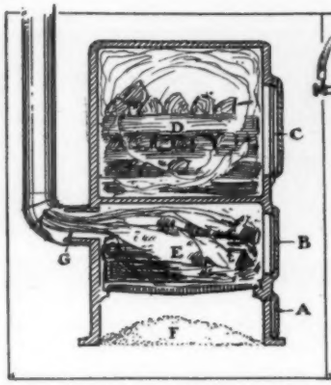


Fig. 6.—Coke is formed out of carbonaceous matter by heat in absence of oxygen.

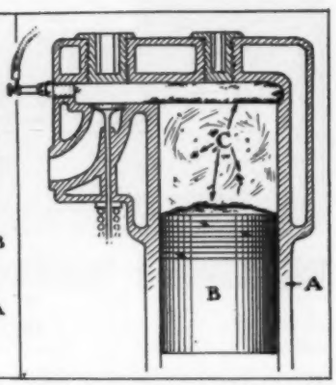


Fig. 7.—Carbon collects in the cylinders in the same way that coke is formed.

LAWS HAMPER TAXICAB USE IN MONTREAL.

MONTREAL, April 5.—This city would like to have taxicabs, and there are two concerns which would be glad to please the residents, but the laws of the Quebec Legislature are such that the taxicabs cannot get licenses to do a hacking business. The Legislature has ruled that all automobiles and motor vehicles come under its jurisdiction and that municipalities must not pass laws affecting them. Therefore this city cannot pass a statute which would allow of giving licenses to automobiles. If the law is amended, then the city would be able to take the necessary action.

NEW YORK TAXICAB COMPANIES MERGE.

NEW YORK CITY, April 5.—The president of the New York Taxi-Service Company has announced the absorption of the Hexter Taxicab Company. This will swell the number of vehicles operated by the new concern by 50, now in operation, 50 more ordered and 12 touring cars. This added to the previous figures will give Mr. Whipple's company about one-fourth of the total number of cabs operating in the city. One outcome of the combination, according to the officials, is the possibility of still more absorption with ultimate reduction of rates.

SOMETHING DOING IN ATLANTA, TOO.

ATLANTA, GA., April 5.—The announcement was made a few days ago that a second taxicab service would be started in this city. No sooner was this made public than Manager Dunn, of the first cab line, known as the Atlanta Taxicab Company, left for the North to buy more cars. The first vehicles obtained were low priced, but the second installment will be of a very high class. This company has a large force of men at work on its garage on Ellis street, which will soon be ready. This is a very favorable location near the center of the city.

DRIVERS WILL GET STRAIGHT SALARY NOW.

BOSTON, April 5.—A new plan, which is intended to put an end to many of the troubles in connection with the taxicab service here, has just been put into effect. This consists of paying the drivers a weekly salary in place of paying a percentage of the gross receipts and charging for the gasoline. This move of the Taxi-Service Company is expected to give customers better service.

NOVEL AUTOMOBILE REPAIR SHOP.

The most novel repair shop known to the automobile trade is that belonging to the J. F. Thompson Repair Company, of Oakland, Cal. It consists of a platform and enclosed body mounted upon a 40-horsepower Rambler chassis. Within this is located the repair shop, which is well equipped, having a lathe with 10-inch swing, two 12-inch emery wheels, key seater, polishing wheels, glass rack, tool cabinets, benches and complete plumbers' outfit. The power for the machinery is derived from a 3-horsepower motorcycle engine. The owners have selected as their motto, with which the exterior of the vehicle is decorated, "We repair anything from a stewpan to an airship."

This is typical of the firm, which is very progressive and nothing if not hustlers. The outfit itself bespeaks their progressiveness, being not an old cripple, but an up-to-date touring car chassis, while the body is very well built for the purpose and not an adapted dry-goods box. Under the circumstances the tool equipment is a remarkably complete one, including, as it does, many tools, such as a large diameter lathe, not ordinarily seen outside of a good-sized machine shop.

Despite the large number of tools carried and the big enclosed body the total weight is but 4,220 pounds. The owners travel about Oakland, San Francisco, and vicinity, plying their trade and making no attempt at speed.

How a Rambler Chassis Is Utilized for Repair Shop.

Automobile Cooling Systems Analyzed

BY MORRIS A HALL

PART IV

CONSIDERING the relative value of detached and integral fins on radiator tubes, it might be said that the efficiency of fins is very nearly equal to that of other radiating surfaces when the fin thickness is restricted to that of the tube and the spacing suitably proportioned, but for any thickness the maximum ratio of the fin diameter to the external diameter of the tube is a fixed quantity, and, if exceeded, the loss is in proportion to the excess.

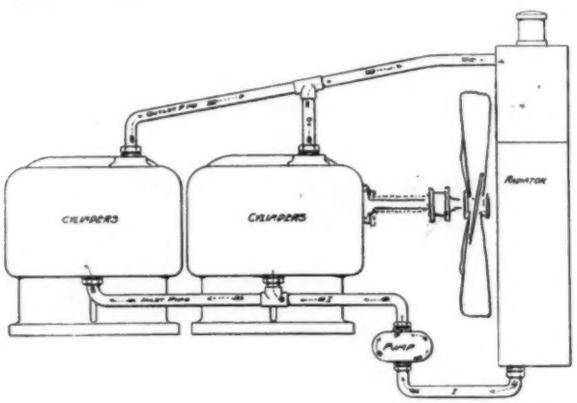


Fig. 14.—Diagram of typical cooling system.

In all of the above the surfaces and substances are treated from the viewpoint of inherent ability of stationary or fixed position. While the volume of heat to be dissipated is not great in the total, the time element enters, in that this dissipation must occur in a very short space of time. To cool a gasoline engine as used in the ordinary car with a cooler of the best possible materials, under the most favorable conditions and most efficiently, would require a radiator bigger than the car itself, if the radiator stood still or the air was allowed to flow through it naturally.

So to reduce the size to something that can be used, the relative efficiency is increased. This is done by an artificial flow of the cooling medium; in this case, air. This increase in the flow of air is brought about in two ways, usually working simultaneously. One of these is that the radiator does not stand still, but is moved with the car. This forces air through the cooler at a rate equal to the rate of speed of the car multiplied by the coefficient of loss. This would not be effective with the car standing still but the engine running, so a second artificial circulating means is provided in the fan.

Rapidly Rotating Fan Does the Business.—It is driven from the engine, and so rotates when that rotates. If the engine runs slowly and has little heat to dispose of, the fan runs slowly. When the former turns over at a maximum rate of speed, the fan, too, is making the highest possible number of turns.

Air is such a very bad conductor and metals are so good in comparison that in heating still air, the quantity of heat the air will carry off is practically the same with a number of metals. Even with the air artificially circulated, this remains true up to considerable speeds. For this reason, also, the thickness of the metal has little effect. The rate of transmission is inversely as the thickness, but so high compared to the air that the heat is supplied even through a thick plate faster than the air can carry it away. This is an added reason for supplying the latter at a very high rate of speed. Experimental data bears out this contention. Thus: heat flow in units per degree per square foot of surface per minute:

In still air	.0356
In gentle breeze	.0397
In fresh breeze	.0750
In fan blast	.0900

If any discussion of these results were necessary it would be sufficient to point out that under exactly similar conditions the fan blast removed nearly three times as many units of heat as were taken away at the slower air speed here called "in still air." In this connection it is to be regretted that definite figures corresponding to these rather indefinite phrases are not available, as it is believed that these would bring out even more forcibly the point made above. An Englishman, named Craddock, found that hot water in tubes, moved at the rate of 40 miles per hour, lost heat at 12 times the rate of tubes that were stationary. The inverse of his statement would be that fans and other provisions for circulating the cooling air at the rate of 40 miles per hour would be just 12 times as efficient as no provision whatever or natural air circulation.

This brings up the subject of fans, neglected by many as of little importance. Having just made out a case for the importance, a glance at some fans will be of interest. The fan problem may be attacked in either one of two ways, or perchance both. One of these is the location directly back of the radiator, drawing air through the radiator only. The other is the rear or flywheel location, drawing air through the radiator and thence across the whole of the engine, and thus effecting secondary cooling. Fig. 14 shows a diagram of a complete circulating system, in which the first method is utilized.

Great Variety in the Types of Fans Employed.—Even with this apparently simple and standard cooling arrangement, the appearance, type, and efficiency differ very markedly from one car to another. Thus at one of the recent automobile shows some one statistically inclined found that of 23 cars examined 7 had both forward and flywheel fans; 7 had rims around the outside of the fan; the number of blades varied from 4 to 8 (Fig. 15 shows one that has 12), the width of the blades varied from 3 to 6 inches, and the outside diameter ranged from 14 to 24 inches, the average being about 18 1-2 inches.

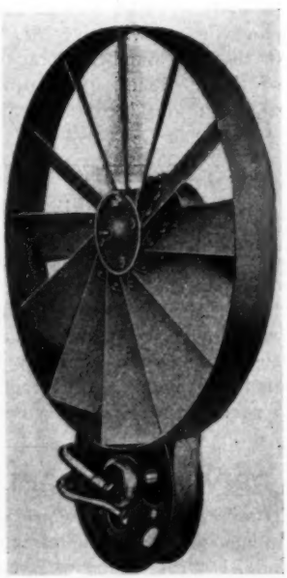


Fig. 15.—Example of the indiscriminate use of very many fan blades, a poor design.

With such a wide divergence in current practice there must be something wrong. This lies in the fact that the subject, instead of being handled with the care it deserved, has been shamefully treated. The fans were built, not designed, and when put to work either did the work or failed. In the latter case, a

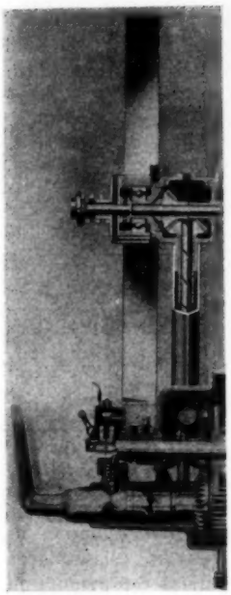


Fig. 17.—Bevel gear drive in section, showing clutch at left.

larger diameter was substituted, or the number of speeds increased, or the whole mechanism speeded up.

In the design of fans, the type enters; that is, whether of the disk or centrifugal style. Then there are the number of blades, width and angle of blades, external and internal diameters, speed of revolution, and a few minor points. For an enclosed fan blower of the centrifugal type the formula holds good:

Capacity, $C = 1.38\ r^3 D^3 N$, in which

N is the number of revolutions per minute.

D = the outside diameter in feet.

r = the ratio of inside to outside diameter.

This capacity is expressed in cubic feet per minute, under the condition that the full quantity can pass through the opening known as the blast area, without lowering the pressure in the housing. Under these conditions tests have produced quantities which only fell off from the formula rating by 10 per cent., and in some cases equaled it. From which it might be taken that it represents correctly the desired amount, under proper conditions.

However, this is for a fan with a housing, and unless the ordinary airtight bonnet may be considered as an imperfect housing, this formula will be of no service. By the time that constants have been determined and introduced to care for this, the result would be far from the above and, probably, equally far from right, if not actually incorrect.

Even this difficulty, made clear by the above discussion, does not excuse the lack of an experimental determination of the correct number and arrangement of parts.

Drive Shows Equal Diversity.—The method of driving the fan varies as much as does the type and features. There are the flat, round, trapezoidal, and other forms of belt drive, bevel gear, skew or helical gear and worm drive. In the case of all but the few strictly mechanical arrangements, there is expected to be some slippage, but in the latter case there can be none. So with the various gear drives, a clutch is provided which may slip at the time of starting, and thus preserve the fan from self-destruction, at that time.

The elements of a bevel-gear-driven outfit are shown in Fig. 17. The clutch is at the outer or forward end, and is there seen to be extremely simple, consisting only of a flat plate normally held in engagement by a coiled spring.

With the fan flywheel method of drawing air through, one of two ways is used: either the fan blades are made an integral portion of the interior of the wheel, acting as spokes thereof, or they are found distributed around the circumference, in which case they can be either integral or applied. In the first method, the disadvantage is that the clutch is either reduced to a minimum size by the length of the fan spokes, or, starting with the required diameter of clutch, the external size of the flywheel reaches to a figure which prevents its use. Between the two is the case in which neither one is as large as would be advisable, but the whole is such as to go in the car. Fig. 18 illustrates a flywheel of this type. This was used in connection with a disk clutch of very small diameter, but with a large number of plates. This type has the excellent quality of putting the flywheel weight where it should be and where it is intended to be. This can be stated in different language by saying that this form of flywheel has the greatest ratio of effective effort to actual weight.

The other style of flywheel fan has the blades external to the flywheel proper. This means that they may be applied or removed at will unless cast integral. One disadvantage of this form is the matter of available space. More clearance must be allowed around the fan than for a smoothly finished flywheel exterior. As this space is predetermined, it means cutting down the size of the effective part. This, in turn, means an increase in the dead weight to give the same flywheel effect. The latter is a permanent addition to the weight of the car. An additional disadvantage is that while the motor is running one must be careful of this rotating part, for with the external blades, it is dangerous and liable to take off a hand or a few fingers.

This is not so of the first mentioned arrangement. An advantage of the external fan blades is that their location is such as to give additional ability as a fan, in that the larger diameter will handle more air, and the same increased size give an increased lineal speed for the same number of revolutions. Summed up, this type gives the maximum fan and the minimum flywheel action. The first type, on the other hand, gives the maximum flywheel action with less weight and slightly decreased fan results. Fig. 19 is a picture of a typical example of the second kind, showing the fan blades cast integrally.

Oil Cooling Presents Some Good Features.—In one of the earlier chapters of this story mention was made of the use of other liquids than water for cooling purposes. In this category would come water with a very large percentage of foreign matter, such as alcohol, calcium solutions, glycerine, or other substances added in such quantities as to alter the boiling and freezing points and the general performance of the resulting liquid. These liquids would be different, but what were referred to were other liquids of an entirely different nature fundamentally, such as oil, or any petroleum product.

This has many times been advocated for cooling purposes, particularly in cold weather, when much stress was laid upon the very low freezing point of oil as compared with water. This means that every cold spell the owner of a water-cooled machine must introduce into the cooling system a solution which will combine with the water and reduce the freezing point of the whole below any temperature that is liable to be met. Otherwise, the chance is taken that the fluid will freeze, and in so doing burst the water jackets. This necessitates new cylinder casting, with consequent expense, work and delay.

With oil this source of trouble would be excluded, for even the thinnest, lightest oil has a freezing point below any temperature met in the temperate zone. So this factor may be eliminated and attention concentrated on the boiling point. It varies

Fig. 16.—Shows a very good arrangement of fan and piping.

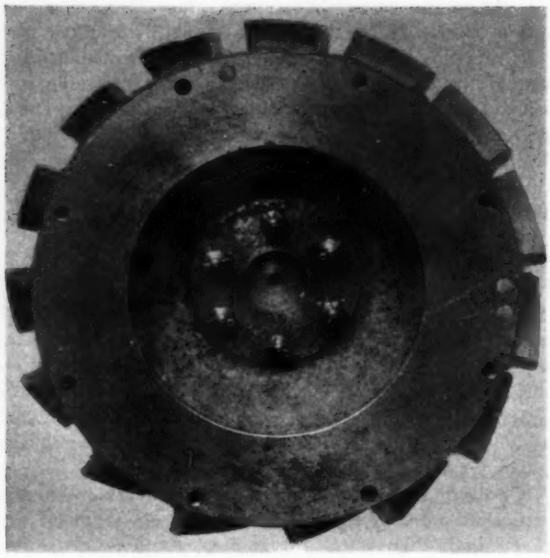


Fig. 19.—An alternate disposition of flywheel and fan.

with different substances, and in substances of the same general character varies with the chemical composition. In the distillation of petroleum the products have the same general composition, but the boiling point differs. Then a table of boiling points will look like this:

Ethyl Alcohol	173	degrees	Fahr.
Water	212	"	"
Saturated Brine	226	"	"
Light Lubricating Oil	383	"	"
American Mineral Oil	383	"	"
Dodecane (Paraffin Series)	385	"	"
Tridecane " "	421	"	"
Tetradecane " "	457	"	"
Triamylene (Olefine "	478	"	"
Pentadecane (Paraffin "	491	"	"
Linseed Oil	597	"	"

It should not be taken from this that these temperatures are advocated or even advisable. The point to be brought out here is that any substance whose boiling point is above that of water will be more useful. If the temperatures such as those at the end of the table were used the engine would be hopelessly ruined. Moreever, the use of vegetable oils is not recommended, although they are given in the table.

There are several firms in the Middle West using oil as a cooling medium, one of which has been using it for three or four years with the best of success. These people put their machines out into the hands of persons who have absolutely no mechanical skill and very little mental capacity. This being the case, there is a great necessity for a machine that is fool-proof. Oil as a cooling medium seems to fill the bill in this respect, for no amount of neglect can do the slightest harm. Cold weather will not affect it, at least not in any dangerous or destructive way, heat has no injurious results, care of the whole system is reduced to a minimum, a big point when the class of labor just mentioned is employed, in fact the only real necessity is the replenishing of the oil lost in natural and unavoidable ways, such as small leaks, slight evaporation losses due to inequality of the oil, and other minor ways. So it may be said, without fear of contradiction, that this cooling medium is ideal.

Radiators Are More Efficient with Oil.—Another claim made for oil used for this purpose has to deal with the fact that with water or other low-boiling-point fluid, the radiator is not worked to its full efficiency. It is said of honeycomb radiators, in particular, that they are too efficient; that is, they cool the water too much. This objection would be met squarely by the use of any liquid which had the power to remove a greater amount of heat from the engine, this being restricted in the case of water by its low boiling point. Oil would do this, anad coming to the radiator with a greater initial temperature, would require the same final temperature, thus calling for an increased efficiency on the part of the radiator.

Tests which have been made upon oil bear out this contention. Fig. 20 shows the arrangement of the apparatus used in the test. In the foreground is the engine, and beyond it and slightly above is seen the fan housing. At the right is the prony brake, and beyond it the starting rheostat for the electric motor which drove the fan. At the left are the pump and tanks to measure the weight of the oil, set upon scales. Some of the results obtained were:

RADIATOR NO. 1.

Fluid	Heat Dissipated Units	Temp. Drop Degrees.
Water	490	25
Oil	700	12

RADIATOR NO. 2.

Water	490	40
Oil	700	18

From these results the conclusion is drawn that all radiators are at least 50 per cent. more efficient with oil than with water. This, as stated above, allows of abstracting more heat from the motor, which in turn allows of working it at a much higher temperature, and thus a greater thermal efficiency.

An indirect advantage of oil-cooling is the decrease in the mechanical losses with increased temperature. This latter is a mooted question, but the majority of evidence seems to favor the statement that higher temperature means greater mechanical efficiency. The writer's own experience in this matter showed for the same load and speed, same general conditions throughout, an increase of from 10 to 15 per cent. in mechanical efficiency was possible by increasing the temperature of the outgoing water from about 160 degrees Fahr. up to boiling point, or as close thereto as could be maintained using water. One test, to prove this point, resulted as follows:

Water Outlet Temp.....	69	150	185	203	220
Horsepower Loss.....	7.1	5.5	5.0	4.5	4.2
Mechanical Efficiency.....	85.0	88.0	89.0	90.0	91.0

The last set of results was obtained by plotting the others as a curve and taking a more advanced point from that curve.

The data necessary to plot a complete curve of this nature being at hand, it is believed that this appreciation of mechanical efficiency and depreciation of horsepower loss will reach a high point or peak at or near 250 degrees outlet temperature, the statement of a well-known authority on cooling to the contrary. With this temperature it would be easy to maintain efficient lubrication, which could not be said for more advanced degrees of heat. In this connection it must be carried in mind that the temperature mentioned is that of the outlet and not of the cylinder walls which will be higher in proportion.

The whole seems to make out an excellent case for the use of oil, but, strange to say, with the exception of the two Western firms mentioned, a couple of French tractors and a few German builders of heavy cars, these advantages have not been put to a practical use, despite the many excellent features brought out. The one large redeeming feature of such use is the fact that it would cost nothing beyond the oil itself, and entails no mechanical complications. A pump is practically a

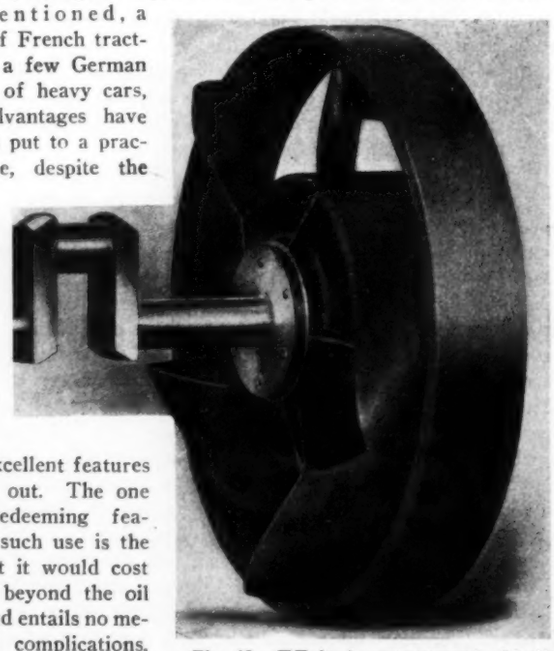


Fig. 18.—Efficient arrangement of both fan and flywheel in a unit.

necessity, but any car already so equipped may be changed over to an oil cooler in the length of time it takes to tell about it.

Natural or Thermo-Siphon Method of Cooling.—The thermo-siphon system of cooling depends for its action upon the fact that water when heated becomes lighter, and therefore in a large body of water the heated portion tends to rise or the cooler part to sink. Thus a change in temperature will cause internal action which, if carried far enough and with proper inlet and outlet pipes, will result in a continuous circuit—at least the circuit will be continuous as long as there is a source of heat. As indicative of the difference that the temperature makes, the table of relative volumes of water at different temperatures is given from maximum density to boiling point:

Temp. Fahr.	Volume.	Temp. Fahr.	Volume.
39.1	1.0000	122	1.0118
50	1.0003	149	1.0196
77	1.0029	176	1.0287
86	1.0043	194	1.0357
95	1.0059	203	1.0395
104	1.0077	212	1.0434

As a large difference in the temperature would be necessary to cause any considerable flow in a closed system, such as an automobile cooling system, the motor must necessarily be run rather hotter than the same motor and cooling system could be run with the water mechanically circulated. This is not only true, but the advocates of this method consider it an additional advantage of their system for the reason that a hotter motor is more efficient thermally and mechanically.

One very prominent advocate says that the engine is hotter when the water is boiling rapidly than when it is boiling slowly and it is a fact that because the water is absorbing more heat units proves not that the engine is cooler than before, but that it is doing harder work. It is certain that when the water is boiling very rapidly there is more difference in volume and more positive circulation than when it is boiling slowly.

Water Allowed to Boil and Steam Condensed.—The same authority goes on to say that he favors boiling water as the proper temperature and a gravity circulation as the proper method because this method insures a fixed temperature for the engine to work at. In this view he does not stand alone, for a prominent French house not only agrees, but has carried the principle still farther in practice. The Gillet-Forest system allows the jacket water to boil and produce steam. This is then condensed in the radiator. The cylinder jackets are kept filled by means of a float valve, which allows water to enter in such a quantity as to replace that turned into steam.

If the cooling medium is kept at any temperature below the boiling point this temperature will necessarily vary as the work varies. In the case of air-cooled engines this temperature will vary with the speed of the car, engine and the velocity of the wind. In the case of pump circulation, on the other hand, this will vary as the speed of the pump varies. With boiling water, however, this remains constant, permits of the finest adjustment of the mixture and the least amount of necessary variation in the point of most advantageous spark.

The rapid spread of this system in the past two years, previous to which it had but a couple of advocates, speaks volumes for the favorable results obtained. The very latest car announced, a small light car at a popular price, by one of France's most famous constructors, has used this system. While this particular case may only mean that the manufacturing cost on this specific model has been reduced as low as possible, its success on the light car will result in its adoption on larger models.

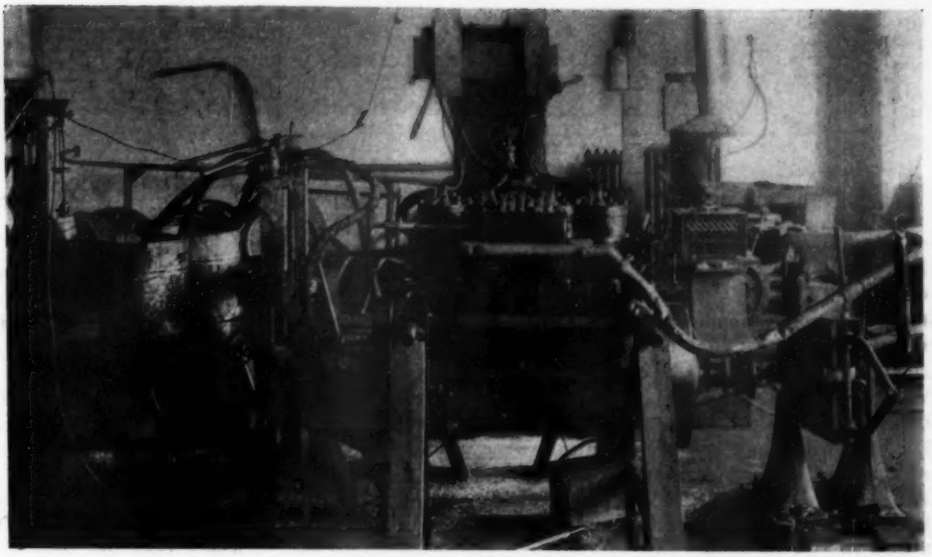


Fig. 20.—Oil testing apparatus ready for the test.

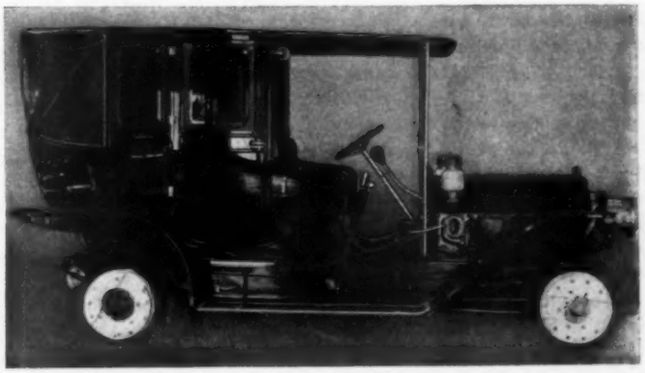
The direct cooling by means of air, forced or blown directly against the cylinder walls, which are increased in radiating power by the addition of fins, has many friends and, perhaps, many more enemies. The fact remains that it works and works continuously on several makes using this method. The French originally tried this way of cooling, and after testing it out, would have none of it. The fact is to-day that one would have to search France over pretty thoroughly to find a reputable manufacturer building air-cooled engines for cars only. That really proves nothing, but the fact that many American builders of that style of engine have been obliged to bring out a water-cooled model in addition, is good evidence of the attitude of the people toward it regardless of its theoretical or practical advantages.

NECESSITY IS THE MOTHER OF INVENTION.

INDIANAPOLIS, IND., April 5.—Necessity being the mother of invention, this fact is again illustrated in the accompanying photograph, which shows the expediency adopted by the Nordyke & Marmon Company to get a large Marmon landaulet through a low door into its salesrooms in Indianapolis.

The 36-inch wheels were removed and 18-inch wooden wheels, with cotton belt tires, were substituted, the car then being driven, by its own power, over pavements two squares, and into the building to its place. The large expanding brake shoes, 17 inches in diameter, had only ½ inch clearance.

The Marmon salesroom is a large, well lighted, finely appointed room in the new office building of the Central Union Telephone Company, corner of New York and Meridian streets. This location is to be permanent, and the company has also secured splendid quarters, within one-half block of the salesroom, for storage of demonstrating cars, and with every facility for the care and attention of the cars of Marmon customers.



Wooden Wheels on Marmon that Passed It Through Low Door.

Some Aids in Proper Care of Tires

By Stillman Taylor.

THE pneumatic tire is a very pertinent subject for discussion, and while much has been written upon the choice of size, proper inflation, and care of the "rubber tube," this subject is by no means generally given the careful attention it deserves. That the average owner and driver is very prone to treat with careless indifference this important detail of the car, is very apparent to any observer who is at all familiar with the subject. Why this should be so, is something of a mystery, when we consider the very large amount annually invested in tubes and shoes. Although it is an almost universal custom to lay the blame upon the manufacturer when anything happens *en tour*, it does not necessarily follow that the tires are defective. Indeed, the real source of trouble is far more likely to be found with the driver himself, and may be often directly traced to lack of proper care and abuse. The manufacture of pneumatic tires has long since passed out of the experimental stage, and a score or more concerns are to-day turning out tires that are as near mechanical perfection as the best materials and skilled labor can produce.

Common Causes of Rapid Wear.—While a tire may be injured in a variety of ways, the common causes of rapid wear may be said to be due to improper and insecure attachment, careless driving, and hard service. Any one or all of these things may contribute to shorten the life of the tire. Rim cutting, blowouts, and excessive tread wear are unmistakable evidence of careless driving and may be greatly lessened if not entirely avoided by proper care. Punctures and deterioration caused by chemical action or rotting of the fiber, may also be reduced to the minimum by taking certain precautions.

Selection of Tire Sizes Is Very Important.—That the owner may get the most mileage out of his tires, it is important that high grade tires of ample size be first selected. To equip a car with cheap tires is to invite trouble, which for very obvious reasons also applies if the tires are overloaded. A certain amount of reserve strength is necessary for servicability, and unless an amply large size is selected for the work called upon to perform, much annoyance and expense may be expected.

Forty per cent. reserve strength may be calculated sufficient for average driving, but 50 per cent. will not be found wanting when a bad piece of roadway is encountered. It is much better to allow a bit extra than to start out handicapped and "under shod." As the rear wheels support some 75 per cent. of the total load, it is highly important that the driving wheels be provided with tires of generous size.

Too Free Use of Brakes.—A too free use of the brakes is perhaps the commonest source of tire wear. With the exception of those occasions when it is imperative to check the car as quickly as possible, the use of the brake should be dispensed with. Braking is greatly overdone by most drivers, and the habitual use of powerful hand brakes cannot but prove harmful to the tires, owing to the sliding of the wheels which ensues before the momentum of the car is overcome.

Learn to control the car's speed by the throttle and spark and prolong the life of the tires by closing the throttle, disengaging the clutch and allowing the car to coast to a stop. By all means avoid the nefarious practice of bringing the car to a stop by letting the tires rub against the curbing. This slipshod method cannot be too strongly condemned, inasmuch as it rapidly wears out the shoe, loosens up the tread and allows dirt and water to work in to rot the fabric. Driving in car tracks is bad practice, which brings undue wear.

How to Prevent Blowouts.—That bugbear of the autoist—the blowout—may be largely done away with by keeping the lugs screwed up tightly. This is necessary to prevent any side play of the shoe within its rim. Loose lugs not only permit the tire to creep and roll out from the rim when rounding a curve, but the side play is often sufficient to completely shear off the valve stem. For the sake of safety, if for no other consideration, too much attention cannot be given to the tire fastening, and the lugs should be frequently examined and any looseness taken up, both before and after a run.

Rim cutting is generally caused either by overloading or lack of sufficient inflation. If the tires are called upon to carry a greater load than their dimensions are calculated to bear, no amount of pumping will keep them from flattening under the excessive load. This invariably results in the cracking and breaking down of the tire at its weakest point—where the flange engages the clinch. Badly fitting or misshapen rims are productive of the same ill effects as overloading.

Rusty rims are likewise to be avoided, and they should be occasionally gone over and cleaned of any rust that may have accumulated. A coat or two of enamel will often prevent further corrosion, or the rims may be given a coat of wax. This is the better method, and is the only satisfactory way of treating the rusty rims of an old car. To make a thorough job, the metal should be well scraped and sandpapered. The wax (preferably beeswax) should be heated and applied in a liquid state. The wax will not injure the rubber in the slightest, and by keeping out the air prevents further rusting of the metal.

The surface of the rim which comes in contact with the inner tube should be smooth. If rough, it is likely to wear and damage the tube, in which case the rim should be wrapped with a layer or two of tape, the loose ends being cemented in place. This tape may be obtained at any dry goods store.

Precautions to Be Taken After an Accident.—Excessive wear may be attributed to several things, as bad cuts, side slip, excessive braking, and speeding. Accidents are apt to occur to the most careful drivers, and upon such occasions the tire should be replaced at once. A small hole in the shoe will need no repair other than sealing up the aperture with rubber solution. This should be done before dirt and sand have a chance to work inside. In case a tire cannot be repaired on the road and an extra one is not at hand, it should be removed and the rim wound with three or four turns of rope, the ends being fastened to the spokes. Or if preferred, the tube may be removed and the casing filled with rope; this being accomplished by removing one side of the clinch and winding the rope around the circumference of the rim inside the casing. Care should be taken that there is enough clearance for inserting the flange in the clinch of the rim. This will give the requisite support and keep the casing from undue flattening and cracking of its retaining walls.

A convenient way for locating nonparallelism in the steering wheels is accomplished as follows: Turn the wheels in position for straight ahead running, and measure the distance between the front rims or tires. This measurement should be taken at the height of the hub and at the back of the wheel. Procure a stick and mark the spots between measurements. Now push the car forward until the front wheels make one-half a revolution, and take a second measurement at the same point (this will be at the front of the wheel, owing to the half turn forward). If the wheels are parallel, the two measurements should correspond. If there is a variation, the obvious remedy is to take up the lost motion in the parts.

Speeding Has a Very Destructive Effect.—Speeding is another cause of tire wear and the friction created by high speeds will often heat the metal rim uncomfortably hot for the hand to bear. A liberal use of talcum or soapstone will do much to prolong the life of the tire, acting as a kind of lubricant between the inner tube and casing.

Information for the Man Who Drives

EVERY once in so often, the exact time varying with the quality of the original finish and the conditions of use, it becomes necessary to have a car repainted, if it is to maintain a presentable appearance. Ordinarily such work should be entrusted only to an experienced carriage painter, but the excessive charge frequently assessed by such professional talent, often much greater in amout than is asked for an equivalent amount of work on horse vehicles, have caused more than one autoist, especially among the owners of the lower-priced cars, to essay the task without expert assistance.

In deciding to venture upon an amateur job of automobile painting, however, there are several points to be considered. First, it must be understood at the outset that it is not practicable to undertake a high-class coach finish for a number of reasons. Such work requires a great deal of time, not merely in applying the paint and varnish, but in waiting for the various coats to dry and in rubbing them down with polishing materials. The amateur will be wise to satisfy himself with one of the many excellent prepared paints, with the varnish admixed, such as are sold for painting wagons and carriages. These are obtainable in everything but the gray automobile finishes, go on smoothly and dry quickly. It is particularly important that only the best qualities be used, and the highest price that it is possible to pay is a good guide to quality, as well as being economy in the end, because of the superior quality of the high-priced paints. Brushes, too, must be of the very best, since any others will shed bristles on the work and ruin it. No paint with linseed oil in it is to be used, because of the tendency of this oil to cause cracking. If the paint requires thinning, use pure turpentine. Two coats of the right sort of paint should be sufficient.

Of the utmost importance is the preparation of the surface for painting. The least preparation that can be tolerated is to sandpaper down the old paint, evening off all rough edges, and following this by removal of all grease with kerosene and gasoline. Better than this, however, is to remove all paint, which can be most easily and quickly done by some of the chemical preparations sold by the paint manufacturers, thus avoiding the laborious methods of burning and scraping, or the injurious use of lye compounds. The preparations referred to are applied with a brush, and in a few minutes the paint swells, loosens and comes off, a second application hastening the operation.

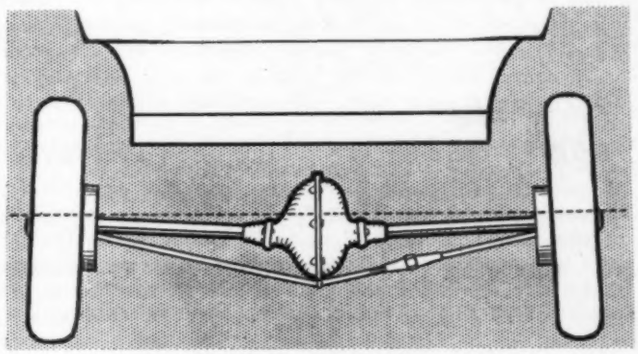
Striping is a work that ordinarily will justify the employment of an expert carriage painter for a half day, though a man with a steady hand and some preliminary practice, or with the simple striping machines now on the market, will find it surprisingly easy to achieve a very fair result.

Use for Railway Air Hose.—It is not widely advertised by the railway companies, but it is no less a fact that the air hose used to connect the air-brakes and train signal systems of adjacent cars can be made to constitute an excellent substitute for an unserviceable water connection on almost any standard automobile. As is extensively known, these connections generally are made of large-size rubber hose, and are given to leakage and wear as a result of prolonged use. A Western motorist recently found a section of such hose from a freight car that stood on a siding, the solution of a serious dilemma, which might have resulted in a long walk and then a delay for shipment of large enough hose, had not the railroad company thoughtfully provided the cure for his difficulty in the manner stated.

Consideration for the crew of the way freight will dictate that the required few inches of hose be cut not from the middle but from one end of the air connection, thus leaving it possible still to utilize what is left. For the same reason, if more than one connection is required, the different pieces should be cut from different cars, so as not to shorten the quota of any one unduly. And, of course, the honesty of the average autoist will suggest that the railroad be remunerated by a check, or, better, an anonymous contribution, forwarded to the proper officials.

Adjusting Truss Rods.—With standard types of shaft-driven autos, the normal straightness of the rear axle is, in most cases, maintained by a truss rod, pinned at its ends to the axle tube, bowed at its center by the bevel-gear housing and made adjustable for length by a turnbuckle.

It is inevitable that from time to time such an axle will require readjustment, no matter how well it may be designed or constructed. The long-continued terrific hammering over road inequalities, whether or not it is accompanied by slight wear of the pins and eyes, and at the point of contact with the bevel-gear housing, is almost certain to sag the axle to a greater or lesser extent at the center. On the other hand, contact with a rock or other obstacle in the road may bend the truss rod, thus shortening



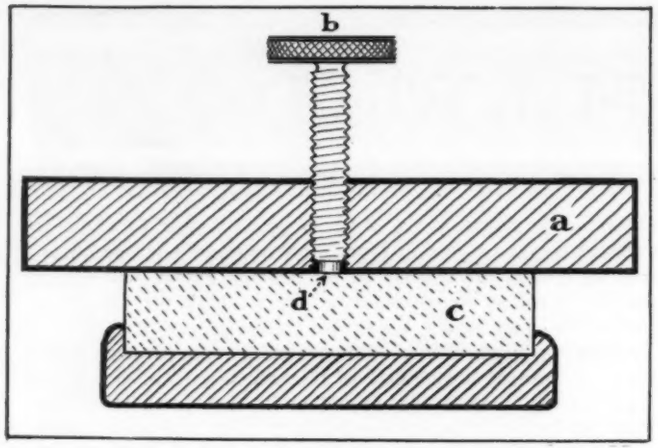
Showing Simple Method of Straightening Axle.

it and throwing the center of the axle up. Either deviation from a straight line is apt to be attended with disastrous consequences—loosening and wear of the rivets by which the axle tubes are held into the housing, wear and breakdown of the floating-axle members, or cutting of the bevel and differential gear teeth.

Bad as it is to run an axle that has become slightly out of line from either of the causes mentioned, a greater danger exists in the frequent ill-advised methods that are employed to effect readjustment, and which often result in a worse condition.

The proper way to secure a correct adjustment is to sight a board or other straight edge against the axle, as shown in the accompanying sketch, thus making it impossible to leave the axle out of true as the result of working the turnbuckle. It is to be noted that the turnbuckle invariably is provided with a lock nut, which must be loosened before adjustment is attempted and set tightly up when it is completed. Beginning with a new car, as the truss rod is adjusted now and again it will come to need adjustment less and less often, unless because of accident, the metal seeming to stretch to a natural limit.

Grinding Fixture for Vibrator Contacts.—In the maintenance of a car equipped with a jump-spark ignition system involving the use of vibrator coils, it becomes very important from time to time that the vibrator contacts be reground to remove the pittings and inequalities occasioned by the unavoidable slight arcing between them. With platinum-iridium contacts of the best quality, the effect of such arcing is reduced to a minimum, but with contacts of poorer quality, it requires frequent atten-



Section Fixture for Grinding Vibrator Contacts.

tion. In any case the problem of securing a perfectly flat and even facing off of the small circular faces of the contact points is one that will trouble the average autoist considerably, as, indeed, it troubles many a very fair machinist. A simple solution of the problem, however, is the use of a grinding fixture approximating the lines of the accompanying sketch, in which (a) is a flat metal plate perforated with a threaded hole for the reception of the trembler adjusting screw; (b) bearing the contact at its point, and (c) is an oil stone for effecting the resurfacing. With this device, the finest possible adjustment can be had of the amount of metal removed, while at the same time the new surface is kept at exact right angles to the axis of the screw.

THOMAS TEST SHOWS EXCELLENT RESULTS.

LAFAYETTE, IND., April 5.—A recent unofficial test of a big Thomas car was made at Purdue University to satisfy the owner's curiosity as to what it would do on the testing stand. The car was a 1909 model 4-60 Thomas Flyer, rated by the manufacturers at 53-horsepower. The motor has a bore of 5 3-4 inches and a stroke of 5 1-2 inches. On the testing stand the drawbar pull, speed and horsepower delivered at the wheels were measured each time and a large number of readings were taken. That is, at certain fixed drawbar weights the speed and power were measured. A few of these readings taken at random are given, these being selected so as to show the possible variation in power with the speed:

Drawbar pull in lbs.	Max. speed in M.P.H.	Horsepower at Wheels.
150	82	32
250	53	36
300	48	38.5
On the second gear, the above being on direct drive		
660	24	41
On the first or low gear		
1,050	13.2	36

The car was geared down 2.23 to 1. The greatest power was developed on the second, which is intended as the hill climbing speed. This was 78 per cent. of the A. L. A. M. rating, a very high rate of efficiency.

After the test the owner, A. L. Sheridan, expressed himself as very well satisfied with the car's performance. No special preparation was made; the car was simply driven over to the laboratory and tested, so that the results here given are not exceptional.

AUTOMOBILE STATISTICS FROM AUSTRALIA.

Consul-General John P. Bray, of Sydney, transmits the following detailed information relative to the importation of motor vehicles into Australia:

According to a customs return recently issued, 3,559 motor vehicles were imported into Australia from 1901 to 1907. Of this total, 1,175 went to New South Wales, 1,436 to Victoria, 132 to Queensland, 496 to South Australia, 224 to Western Australia and 96 to Tasmania. The total import value of these vehicles was $3,392,125, and the duty paid on them amounted to $701,105.

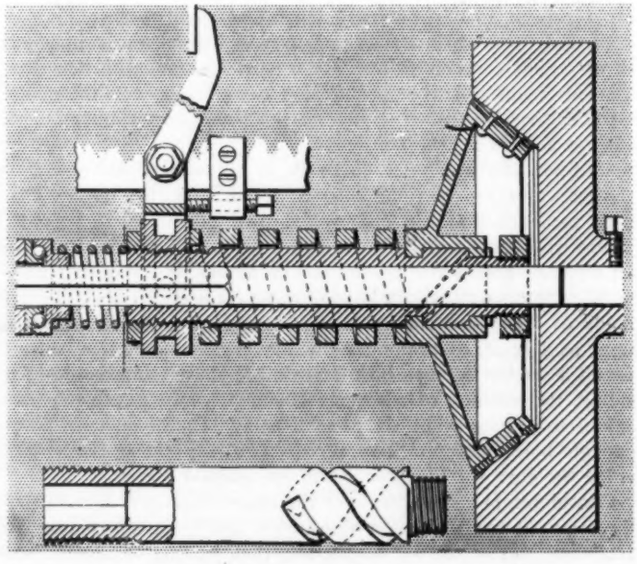
Of the total number of automobiles imported during the years stated, no less than 398 were imported from the United States. In the year 1903 the United States sent to Australia 71 automobiles, valued at $35,262; in 1904, 161, valued at $75,586; in 1905, 122, valued at $63,799, and in 1906, 44, valued at $37,841. The figures for 1907 are not yet complete, nor is it possible to get the figures for the first three quarters of 1908.

Bodies for automobiles, motor trucks and wagons, valued at $135,011, were imported during the same period, the duty amounting to $45,954. There were further imported during the nine months under review chassis for automobiles, motor trucks and wagons of a total value of $933,394, and the duty upon these amounted to the total sum of $22,439.

A NEW ONE IN CLUTCHES.

Anyone who has ever heard the taxicabbies mesh gears will appreciate to the fullest extent any device designed to ensure easy or gradual clutch releasing. The newest idea in the clutch line comes from Morris Ireland, of New York City, and his invention relates to a clutch between two shafts, which automatically releases upon a predetermined load being applied to the driven shaft whereby damage may be prevented.

More particularly it relates to an automobile clutch in which the road shocks are not transmitted to the engine when the clutch is engaged, and the breaking of the gears in changing speed and reversing as well as in starting is prevented. For instance, the driver frequently attempts to start upon too high a gear, which strains the gears, slips the wheels with damage to the tires, or overloads the engine. By means of this invention, in case the vehicle is started at too high a speed, the engagement is automatically released to such an extent as to permit a certain amount of slip between the driving and driven shaft, and thereby the vehicle starts slowly and without straining. The clutch being engaged, it will be seen that the driving torque tends to revolve the clutch cone on the worm backwards and the big spring opposes this force, thus tending to balance it and permit the small spring to hold the clutch in engagement. If the backward component exceeds the forward component the clutch member will be rotated on the sleeve, causing it to screw through the clutch cone until the operating collar has drawn the lever against the set screw, which causes all movement to stop. When this has taken place the clutch member will rotate backwards along sleeve away from clutch, thus causing disengagement. It can thus be seen that the clutch disengages gently as well as engages gently, which is an important advantage of this invention. The adjusting screw allows of a variation in the spring tension, which may be experimented with until the clutch "floats" on the shaft.



Section View of the Ireland Easy Release Clutch.

Letters Interesting and Instructive

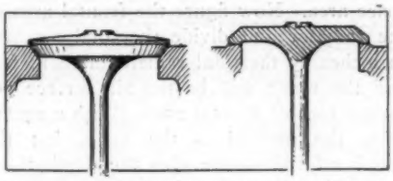
FLAT-SEAT VALVE ADVANTAGE.

Editor THE AUTOMOBILE:

[1,817.]—Please advise me through "Letters Interesting and Instructive," what are the advantages and disadvantages of square seated valves. I understand that a square seated valve is now being used exclusively on a number of the highest grade imported cars. CHARLES J. CHABOT.

Dallas, Texas.

The statement that these valves are used on a number of imported cars is subject to proof, as is also any statement of the advantages. In both types the volume of the opening is equal to the circumference of the effective opening times the



Cone Seat Valve. Flat Seat Valve.

sine of the angle of the valve seat times the lift. In the flat seat construction this angle is 90 degrees and the sine is 1. With the taper seat the angle is usually 45 degrees and the sine is .707. From this it is seen that for the same effective opening and lift the flat seat gives a larger volume of gas than the cone seat in the ratio of 1 to .707. This is utilized by reducing the lift in the same ratio, which ought to give a more quiet action. Users of this type of valve claim that the form reduces the amount of corrosion, and therefore the regrinding necessary.

IN RE MAGNETO WINDINGS.

Editor THE AUTOMOBILE:

[1,818.]—Please tell me through "Letters Interesting and Instructive" how to calculate the size and number of turns of wire for a magneto such as the W. & S. to give an amperage and voltage great enough to run an ordinary spark coil as used on automobiles, the magneto to run three times the normal motor speed. Also, please tell me the voltage and amperage necessary to run an autombile spark coil.

Chicago, Ill. L. E. B.

(a) The electromotive force impressed in the secondary circuit of a spark system may be as high as 30,000 volts.

(b) The current in amperes, at this high voltage is probably very slight. If the source of supply will afford 50 watts, the current will then be $50/30{,}000 = 0.0016 =$ current in amperes.

(c) If the secondary conditions are as above stated, it is then possible to say if the primary circuit will hold to a slightly higher wattage, in view of the losses in the coils, and if 60 watts is taken as the primary value, the same rule will work to find the current, *i.e.*:

$60/5 = 12$ amperes.

(d) In the above, if the measurements are taken, as for an alternating current in one case, the same measurements must hold for all, and in view of the irregular shape of the waves of electromotive force, it will be understood that there can be much uncertainty to contend with.

(e) The primary current in amperes, as given, looks a little high, but it will be remembered that this does not mean 12 amperes out of the battery, which gives a direct current, and there is a correction to be made which might bring the direct current down to about 8 amperes, on a basis of 5 volts, electromotive force.

(f) The calculation of the windings of a magneto must take into account the design of the magnetic circuit, which would take much more space than can be given in the "Letters," but it is proposed to publish an article on this subject within a few weeks. In the meantime if you can use the formula of the electromagnetic induction class, it will be possible to make some headway through the use of the same, which is given as follows:

Considering a rotor of a dynamo electro machine, of which the magneto is a type, the formulæ, in a general way, may be written:

$$E = \frac{t\,s\,\Theta}{10^8} \quad \ldots\ldots (1)$$

$$t = \frac{10^8\,E}{s\,\Theta} \quad \ldots\ldots (2)$$

$$s = \frac{10^8\,E}{t\,\Theta} \quad \ldots\ldots (3)$$

$$\Theta = \frac{10^8\,E}{s\,t} \quad \ldots\ldots (4)$$

When,

E = Electromotive force in volts;

t = Turns of wire on the rotor;

s = Speed of the rotor in revolutions per second;

Θ = Total of the magnetic flux, passing across one air gap between the rotor and the polar face.

From the electromotive force as found above the drop in volts in the windings must be deduced, and the balance will be available for useful work. In a magneto, it is probable that fully one-half of the impressed voltage in the windings of the rotor will be lost, due to the resistance of the wire used in winding the same. The problem is one in which it is the aim to wind as many turns as possible, of the wire of the least possible resistance in ohms, taking into account the greatest possible speed of the rotor, and the highest attainable flux (magnetic) density in the airgap. Consult a table of double cotton covered copper magnet wire, to determine space required for the windings.

GASOLINE MILEAGE RECORD.

Editor THE AUTOMOBILE:

[1,819.]—Please advise me what car holds the record for the greatest mileage on one gallon of gasoline and what the record is?

San Antonio, Texas. C. H. DEAN.

In the two-gallon efficiency contest held in New York City May 5, 1906, a Franklin 16-horsepower car carrying two passengers made 87 miles, which is 43.5 miles per gallon. The system of figuring adopted gave the Franklin first place, while second went to a Frayer-Miller car with five passengers, which covered 47.9 miles, an average of 23.95 miles per gallon. If, on the other hand, the award had been based on the number of ton-miles or passenger-miles, first place would have gone to the Mack observation car, which carried 19 people 17.13 miles. This works out 8.56 miles per gallon, but the passenger-miles per gallon would be 171.3, against 119.75 for the Frayer-Miller and 87 for the Franklin. The ton-mileage per gallon was 39.94 for Mack, 39.16 for Frayer-Miller and 32.62 for Franklin.

Your question brought out the point that mileage alone is not the only desirable feature, and we have gone into this at some length to prove that point. To our knowledge, no similar contest has ever been held, nor have these figures been exceeded.

STANDARDIZATION OF PARTS.

Editor THE AUTOMOBILE:

[1,820.]—It has been stated that the Licensed Association has done a great deal of standardizing of automobile parts. Will you please tell me just what they have done in this line.

Port Jervis, Pa. H. A. MORRIS.

The association has made only a small start toward standardization thus far, but it hopes to do more in the future. In fact, aside from the yoke ends, which were standardized as a matter of getting lower prices on forgings, screw threads, nuts, bolts and screws, little or nothing has been done towards the really important matters of standard wheels, axles, control parts, etc. As for the fine-screw threads, this really is a complication, for there previously were accepted standards, and the one added in no way conformed to those. Of all the subjects worthy of investigation, prior to standardization, no one is more meritorious than the control. Any man who has ever driven in a strange car will appreciate the full force of this. What was the spark advance before is now the retard, the reverse is actuated by the movement which formerly threw in the low speed, and many other inversions which are sure to be a source of trouble.

Some work has been done towards standardizing spark plugs, but the new standard created much trouble in that it was different from all previous sizes. A little

work has been done on wheels and rims, while the engine rating formula was a help, but the real big problems of standardization have not been touched as yet.

TO FIGURE RADIATOR SURFACE.

Editor THE AUTOMOBILE:

[1,821.]—Will you kindly tell me how to figure the radiating surface for an automobile engine, using the tubular form of radiator?

Pottstown, Pa. G. S. H.

A very good empirical rule for this is: multiply the bore by the stroke, times the number of cylinders, and the result will be the number of feet of length of 3-4-inch tubing necessary. To use 5-8-inch tubing, add 1-5; for 1-2-inch tubes, add 1-2; while for 3-8-inch tubes, it will be necessary to double the original figures, and for 1-4-inch size, to triple them.

All this is for tubes spaced three times the diameter apart, and not more than five tubes deep.

So, if you want to figure for a 4 1-2 by 5, four-cylinder engine, you will multiply $4\ 1\text{-}2 \times 5 \times 4 = 90$ feet of 3-4-inch tubing. Then to use 3-8-inch size, multiply by two, giving you 180 feet. By the rule you are limited to 1 1-4 inches center to center. If your space restricts you to, say, 18 inches high, that will allow of 14 spaces, or 15 tubes. For five tubes deep, the limit by the rule, this would give a total of 75 tubes. To have 180 feet of length with 75, you must have them $180/75 = 2$ feet 5 inches long. If your car will not allow this length, you must use a larger sized tube.

SERIES MULTIPLE ADVANTAGES.

Editor THE AUTOMOBILE:

[1,822.]—In a recent issue of your magazine, The Automobile, was an article advocating the use of batteries in series multiple for purposes of economy. Will you please advise me whether the coupling of a series of new batteries with a series of partly used batteries will cause deterioration in the new ones, and if so, whether the used batteries will appreciate in the same proportion as the fresh ones deteriorate?

New York City. E. C. D.

The writer of this paper made the point, as you will notice if you read it again, that the other cells will build up one dead one in discharging through it, with no appreciable losses. If this takes place in one series, why would not the same thing take place with a weak series connected in series multiple? Reasoning forward from this, it is apparent that partly used cells could be used with new ones without excessive depreciation on the part of the latter.

KNIGHT MOTOR AGAIN.

Editor THE AUTOMOBILE:

[1,823.]—I have heard considerable about a new engine called the Knight. Can you tell me anything about it and where I may obtain a good description of it?

Charlestown, W. Va. J. H. DONOVAN.

The Knight engine has the ordinary valves replaced by two sliding sleeves. This was described very fully in THE AUTOMOBILE for October 22, 1908, on pages 572-573. In this week's issue is given a description of a French two-cycle motor with a sleeve in place of valves on the same principle as the Knight.

EXHAUST GAS AND RUBBER.

Editor THE AUTOMOBILE:

[1,824.]—Please advise what is the effect on rubber tires, and what would be the result of using the gas from the exhaust for inflating tires by means of such a contrivance as mentioned in your issue of March 25 under the name of "Maxim Tire Inflation Apparatus."

Zanesville, O. J. B. MORRIS.

The principal constituents of the exhaust gases are carbonic oxide, whose presence indicates incomplete combustion, carbon dioxide, and nitrogen. It is thought that both of the former have a bad effect on rubber, although this has never been proven. If this is not so, the use of the gases for tire inflation would have no injurious effect. That this is the case may be inferred from the fact that some of the tire companies are putting out tanks of compressed carbonic acid gas for this purpose. The other components of the exhaust vary, and some of those occasionally present have a bad effect on tires or any form of rubber. Thus, oxygen is sometimes present and rots rubber. The hydrocarbons, when on hand, act just as does any oil. Others have no bad effect on the fabric, but readily pass through it, so that they only temporarily inflate the tire.

POWDER PREVENTS FRICTION.

Editor THE AUTOMOBILE:

[1,825.]—Is there any way in which the heating of tires can be prevented or lessened, particularly on long runs? I have often worried about this, for on long Summer tours my tires would get so hot that they were uncomfortable to the hand.

Portland, Ohio. A. B. SEE.

This cannot be wholly prevented, but can be lessened very materially by introducing some antifriction powder between the shoe and the inner tube before starting on a long run. Then, in case you have to stop with a puncture, it is a good idea to put in more powder. Some use ground talc, known as talcum powder. Others get a stick of soapstone and rub it over the shoe or tube, or both. There is mention in this issue of a new form of powder for this purpose which is neither talc nor soapstone. Be sure never to use oil, which attacks rubber.

NAPHTHALENE AS CAR FUEL.

Editor THE AUTOMOBILE:

[1,826.]—I read in your editorial, "Fuel Economy Is a Live Topic," in the March 25 issue with a great deal of interest, especially since I have been endeavoring for some time to run my engine more economically. Your figures, 62 per cent, are startling; but do you consider naphthalene blocks adaptable for use on a pleasure car? I have been laboring under the impression that gasoline was the ideal, as well as the most available, fuel for this purpose, and I would appreciate some advice through your "Letters Instructive" department.

New York City. J. L. HERTRAIS.

Naphthalene blocks are fully as applicable to touring cars as to trucks. In the case of the latter, however, economy is the keynote of all truck installations and, consequently, must be of their operation. To sell a truck at all you must first convince the man that it will save money.

The plan might well be worth a trial, but you must remember that gasoline will still be necessary for starting purposes. Gasoline is a good fuel, but the supply is decreasing in the face of an enormous increase in the number of consumers. This will necessitate the use, in the near future, of some other fuel, primarily not quite as good.

HONEYCOMB RADIATOR AREA.

Editor THE AUTOMOBILE:

[1,827.]—Please advise me what area of air space per square foot of frontal area I should get in buying a high grade honeycomb radiator, and how this figure is arrived at?

Pittsburg, Pa. JOHN R. DAVIDSON.

As to the figures you request, 9,000 square inches should be the minimum for a really high-grade cooler. This is figured as follows: inside circumference of tubes times the number of tubes, times the depth of the radiator, which is really the length of the tubes. This will give the total air space area. Now figure the frontal area of the radiator and divide the total air area in inches by the total radiator area in feet and the result will be the air surface per square foot of frontal area. With a square tube, the method is the same, but the length of the square plus the depth times two will replace the circumference in the case given above. If the sides of the tube are corrugated, the length of the corrugated line will have to be figured accurately.

REACTIONS OF ACETYLENE.

Editor THE AUTOMOBILE:

[1,828.]—Please advise what chemical reactions occur when pure compressed acetylene gas explodes from concussion, without the presence of oxygen? What fluid is used in acetylene gas tanks to absorb the gas, which I believe is not a trade secret? What is the essential chemical used in the various decarbonizers? Carbon is usually considered as insoluble, is it not? If so, it would seem as if the action of a decarbonizer was merely the breaking down or dissolving of the binding agent between the particles of carbon and the metal, and then mechanically blowing out these particles. Is this so?

La Salle, Ill. V. A. MATHESON.

The first named reaction is impossible. Although acetylene is regarded as unstable it cannot change its chemical composition without some other element to combine with, as it cannot of itself break down. The formula for acetylene is C_2H_2, and when it combines with air or burns the reaction is expressed as follows:

$$2\,C_2H_2 + 5\,O_2 = 4\,CO_2 + 2\,H_2O.$$

The usual solvent for the compressed gas is acetone or pyroacetic acid, which has the chemical formula $3\,(CH_3)\,O$. Your understanding of the action of decarbonizers is correct.

PATCHING CELLULOID.

Editor THE AUTOMOBILE:

[1,829.]—Some time ago I noticed in Letters Interesting and Instructive" a recipe for patching the celluloid windows in an automobile cape top. But now on wanting the recipe, I cannot find it. Will you kindly give it to me?

Ludington, Mich. M. E. CARTIER.

We do not find the recipe in question, but as acetone is a solvent for celluloid, get a little of that and apply it just as you would any cement.

FRENCH ROTATING SLEEVE TWO-CYCLE MOTOR

THE Ledru two-cycle motor was brought out some time ago, but the excitement incident to the introduction and use of the Knight motor has again drawn attention to it, says Louis Lacoin in Omnia. This motor has no valves but just as the Knight has two sliding sleeves, which take their place, so too, this has a single sleeve which replaces valves. There is this difference, however; in the Knight motor the sleeves reciprocate as the piston does and are driven off of the camshaft by a pair of eccentrics, while in the Ledru engine, the single sleeve rotates, being driven by a worm on a special shaft.

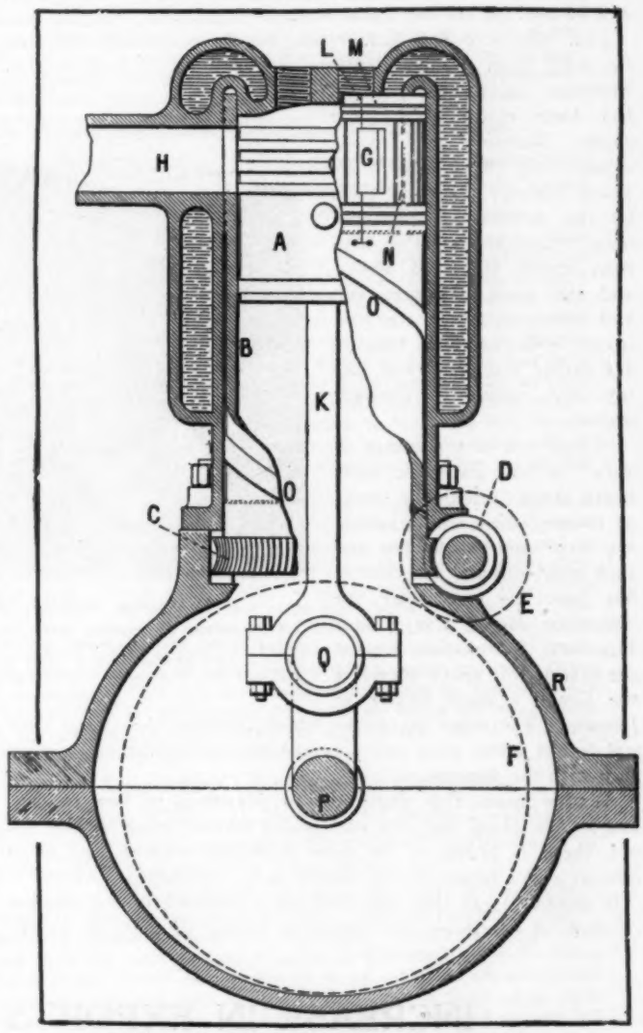
The figure shows a section through the cylinder and exhaust pipe, the inlet not being shown. *A* is the piston driving through the connecting rod *K*, the crankshaft *Q*, of which the center of rotation is at *P*, the split in the crankcase *R*. Upon the crankshaft is mounted a gear *F*, meshing with the gear *E*. The shaft which carries the latter also has a worm *D*. This drives the worm gear *C* which is fixed to the sleeve *B*. In this manner the proper speed of rotation (which in this case is a reduction) is obtained, as is also the rotative motion itself. This rotating sleeve has at its upper end a series of three slots or ports which the turning motion brings successively to register with the inlet and outlet, the latter being shown at *H*. These ports are marked *G* in the figure.

A series of circumferential grooves *M* and longitudinal grooves *N* are used to retain the tightness, no rings being provided. Near the top of the sleeve, and running from each slot to the top as well as some distance below, are cuts, marked *L* in the illustration. To reduce the friction to a minimum, the walls are cut away or relieved up to the immediate region of the inlet and outlet. To go farther would be to endanger the gas tightness which is questionable even with the construction shown. The engine is water jacketed, and the head of this presents a depression very similar to the Knight engine.

In operation the sleeve carrying the three equidistant ports must turn during a complete cycle of the motor through such an angle as will bring one of the ports at the end of the stroke to the place occupied by the port immediately before it. This being the case, it must turn six times more slowly than the crankshaft, a cycle corresponding to two turns. If, then, the motor runs at 600 revolutions per minute, the sleeve must run 100 r.p.m.

The position, size and spacing of the ports together with the speed of the sleeve are such as to follow any predetermined timing. In this way is attained a result never before reached in a two-cycle engine.

Lubrication and cooling seem to offer no difficulties, although in the problem of gas-tightness is a source of real trouble, perhaps the only one, of any consequence. This marks the only real apparent advantage of the Knight over the engine in question, the gas-tightness of the former being beyond question. As to the friction of the rotating sleeve, the point is made that this is less than it would be with the same sized sleeve reciprocating, because the unit pressure is the same in both cases, while the surface must be greater with the sliding sleeve. It is also apparent that the power consumed, aside from friction, is less, because the weight of the sliding part is not started and stopped with every revolution. This is an entirely new and original idea which seems to possess much merit. The whole story can only be told by thorough practical experience.



Section Through Ledru Motor Showing Sleeve.

At the annual general meeting of the Imperial Automobile Club of Germany, it was announced that at the commencement of the year the club possessed 42 honorary, 12 life, 1,240 ordinary, 51 women, and 349 extraordinary members. The expenditures amounted to $89,460, the income to $89,831, only leaving a sum of $371 to be carried over. This small sum, compared with $31,295 in the previous year, is due to the non-holding of a motor show in 1908. The club issued 5,200 triptyques for the United States, France, the Netherlands, Austro-Hungary, Italy, and Switzerland, nearly 2,000 more than in 1908, while up to now 2,318 danger boards have been distributed among the affiliated clubs at a cost of about $525. It was also announced that the club is interested in the "Automobile Traffic and Training Roads, Ltd.," to the tune of about $60,000.

The three-point handicap in the Prince Henry Tour regulations has been protested by several of the big South German clubs, and the Society of German Motor Manufacturers and Traders has also stated its disapproval of so sweeping an embargo, which will keep a number of experienced amateurs away from the start. As the propositions have been, however, out for so long, the Society thinks it best not to absolutely upset the race by a protest, but there will be an alteration in next year's race, the third and last of its kind.

Krupps of Essen, the great German firm of gunmakers, have just concluded a series of tests with a gun destined to burst balloons. The trials ended most satisfactorily. They are also building a new repeating gun to be fitted into an airship.

TOURS FOR REAL TOURISTS CERTAIN OF POPULARITY

By W. C. MARMON.

WITH the passing of Winter and its blizzards, bad roads, high winds and other inconveniences that make touring anything but ideal, and with the incoming of Spring, bringing numerous pleasures to the automobilist, naturally the car owners' thoughts are centered on the various tours and race meets which will be held during the warm Summer months.

That 1909 is to be a banner year for the automobile industry, not only from a manufacturing standpoint, but from one of pleasure, sport and pastime, has been evidenced by the shows. Manufacturers are exerting every effort to meet the heavy demand made on them by the dealers. Dealers are being practically deluged with rush orders from the buyer; and the mails and telegraph and telephone wires are burdened with messages begging for earlier shipments and asking for additional consignments.

Picturesque Fremont Pass in Southern California.

This noted mountain pass in the San Bernardino Range is 28 miles from Los Angeles, at an altitude of 1,770 feet above sea level. The grade of the road is 45 per cent. and the sides of the walls of the pass are 70 feet high.

"There will be a shortage of cars," is the statement daily heard along "automobile rows" of the big cities. Manufacturers were unprepared for any such great demand for cars as has been the case since the American Motor Car Manufacturers' Association started the first of this year's shows in the Grand Central Palace in January. The other big shows which followed the Grand Central Palace affair have added to the makers' burden of keeping pace with the demand.

All this means that there will be thousands of new owners, and as new blood and new enthusiasm become mingled with the old, there is bound to be more individual touring and more interest and a larger list of entries in the competitive events.

It would appear that 1909 will see a record-breaking number of tours of all classes, but instead of having all tours of a competitive nature, with set schedules and long daily runs, why not have national tours similar to that held last Summer through fascinating New England by the Automobile Club of America?

Such enjoyable tours as these would create a great deal of interest. There is no question but what there are many owners who believe in and would enter such tours and who do not care to participate in a more strenuous contest such as the Glidden Tour. A tour running without schedule, in other words, a go-as-you-please event, would arouse interest, especially with women and children. It would arouse interest in the territories through which the great caravan of cars passed.

While such a tour would not necessarily demonstrate the good and bad points of a car for the benefit of the manufacturer, such as is the case in the Glidden, it would demonstrate to the buying public and prospective buyers that the present day car can travel under regular touring conditions over all manner of roads.

If such events are held it would mean that the entrant could stop whenever and wherever he liked, could eat his lunch in the shade of stalwart trees or in a hotel. It would mean that women and children would not become tired out with the day's journey, and that the country and scenery could be better enjoyed than if the car was traveling under schedule and had to arrive at controls at a given time. The elimination of penalizations would leave the mind of the drivers and passengers free to enjoy every bit of the journey.

Many members of the American Motor Car Manufacturers' Association are in sympathy with such tours, and believe that they would instill into the entrants a firmer belief in the automobile and the joys of touring would be better exemplified.

INCREASE IN EXPORTS OF AMERICAN AUTOS.

WASHINGTON, D. C., April 5.—In the monthly summary of the Department of Commerce and Labor, published for the month of February of this year, an increase in the number of automobiles exported is noted, while at the same time there has been a decrease of the amount of imports over that done in the same month of the previous year. In the matter of imports there were 59 automobiles brought into this country last February, as against 79 in 1908, the total value decreasing by $34,610, the figures being: 1909, $128,190; 1908, $162,800. The average for the month of this year is $2,172.71 per car. Of the countries sending cars to the United States, France leads with 33, Italy is second with 13, Germany third with 12, and England is represented by 1. There were no other nations on the list, and this is true also of the month of February, 1908. The falling off is shown by the statistics for last year: France 60, Italy 15, Germany 3, and again England 1. There has been an increase, however, in the importations of parts for foreign automobiles, the figures being: 1909, $61,579; 1908, $36,173.

American-built automobiles to the number of 208 were shipped out of this country during the month of February, an increase of 57 over those sent away in that month of last year, and the average value of this year's product was $1,668.11. The total value was $346,967, as against $301,240, but there were less spare parts needed by American cars this year than last, as shown by a falling off of the value of these by $2,285, the amount sent out this year being valued at $44,839, or $16,740 less than the amount of foreign parts imported. Of the exportation, British North America took by far the largest part, nearly one-third of the total going to Canada. This is the way in which the various countries, leading in the importation of American cars, stood last year: England, Italy, British North America, France, other European countries, West Indies, Mexico, and smaller ones. The change in the standing for 1909 is shown thus: British North America, England, Italy, West Indies and Bermuda, Mexico, France, South America, other European countries.

As far as numbers of cars are concerned there was no change in the exportation of foreign cars between the two months, both registering four, but there was an appreciable difference in the value, for in the recent February the total value was $20,009, as compared with $14,100 for 1908.

AIDS IN THE EXPORTATION OF AMERICAN AUTOS

THOUGH many American automobile manufacturers are at present unable to supply the demand for their product in this country, yet there are concerns looking forward to a time when perhaps there will be a lessened demand here, and these have gone into foreign fields. The United States consular service has been instructed to report frequently upon the conditions in the various countries as to the opportunities for the sale of American automobiles, and the following reports may be found of interest and advantage in building an export trade.

Good Car Demanded by Natives of Bombay.

Consul E. Haldeman Dennison, of Bombay, makes the following suggestions relative to the introduction of American motor cars into India:

The American automobile is little known in India, and still has to prove itself the equal of the Continental makes used. There are now 1,000 cars registered in Bombay, and not one of these is of American make, with the exception of a few "cripples," the remains of a lot of cheap runabouts which were dumped on this market some years ago. This market is well worth the best efforts of American manufacturers and exporters. Among the well-to-do natives the automobile has become popular, and the Continental manufacturers have been reaping a rich harvest from the ever-expanding trade. The native as a rule is unfamiliar with machinery and desires a car that is going to give him the least trouble possible. He is quite willing to pay a good price for a superior machine, and American exporters would do well, when they really determine to exploit this market, to introduce only their best machines.

There is only one road in India that approaches the standard of those in Europe and that is the "trunk line" between Bombay and Calcutta. This would seem to give the American car some advantage, as it is built to negotiate even the roughest sort of roads. Until American manufacturers are ready to expend considerable time and money in developing their trade they might as well not attempt to enter this market, as the writing of letters and sending of catalogues is a waste of time.

America Not Represented Among Many Cars in Burma.

In stating that there are nearly 150 motor cars in Rangoon and probably 50 more at other places in Burma, Consul E. A. Wakefield gives the following trade particulars:

These cars are, with a few exceptions, made in England, selling at prices varying from $500 to $4,000. One French car cost $6,000. A few years ago an American one-cylinder car was sold in India, which gave very poor satisfaction. To-day there are no American cars sold in the province of Burma and to successfully reintroduce them it would undoubtedly be necessary to practically demonstrate their serviceability and durability in a most thorough manner.

It is very questionable if American manufacturers could sell a car here without having the machine on the spot to be thoroughly tested. One car in successful operation would be worth more here than all the correspondence and advertising matter they could send. The roads in and near Rangoon are excellent for touring, so that the number of cars in use is steadily increasing. This is true of Mandalay, Moulmein and Bassein to a more limited extent. If an American manufacturer could secure a Rangoon firm of unquestioned reliability to act as his Burma agent it should be easy to secure a foothold which would lead to a continually increasing business. [A number of Rangoon firms which might represent automobile builders are listed at the Bureau of Manufactures.]

Large Field for Hill Climbers in Portugal.

Vice-Consul-General Charles F. La Serre, of Lisbon, has the following to say about the introduction of American automobiles in Portugal:

There are in Portugal about 1,200 automobiles. Nearly 600 of these are registered at the Governo Civil of Lisbon. Lisbon is a city of over 400,000 inhabitants and of considerable wealth. The automobile business is growing rapidly, and if the American manufacturer intends to make a bid for the business, now is the time to do it. There is only one American automobile in Lisbon; this is a runabout and is in the hands of an agent newly established. One reason why there are no more American cars here is that American concerns have not displayed any energy in demonstrating their machines in this market. Again, the dealers hesitate to try cars of American make because an automobile was imported three or four years ago that did not meet with the requirements demanded here. Lisbon is very hilly, and cars that are used here must be climbers. The lowest horsepower required is 15-20. There are no electric cars or cars of the steamer type in use in Lisbon. It is the experience of the dealers that the former are not suitable for hilly country, and recharging is very expensive.

There are some German and English automobiles sold here, but the favorites are the French and Italian makes, the French being the most popular. The style of car mostly used is the double phaeton or touring car. They vary in price from $1,800 to $5,000. The import duty is comparatively low. According to a recent government report there are in Portugal 8,920 miles of macadamized roads and 2,461 miles in construction.

Tires a Prominent Factor in Australian Trade.

Consul Henry D. Baker, of Hobart, makes the following suggestions to manufacturers of automobiles and parts who desire to share the trade of Tasmania and other Australian States:

American manufactures of automobile tires, if they desire to cater to the trade in Tasmania, should make the goods destined for this market of millimeter sizes and should have their goods shipped with greater care than at present. Most of the cars in use in Tasmania are of British or French make and are all equipped with metric-size rims. It is easier here to get good English or French tires than American tires; even the owners of American cars have nearly all gone to considerable expense in having the rims on their wheels changed to metric sizes. American manufacturers should supply tires in conformity with the sizes in local use and should take care that their goods reach Tasmania in good condition. Their goods might then be sold not only for American cars, but for British and French cars as well.

A common fault with American tires on Tasmanian roads is that they blow out around the edges, due to deterioration of the rubber on the long transit out here, the tires not having been placed in the coolest and driest places possible on the freight ship. The English and French tires arrive in much better condtiion, being shipped with a notice, "Do not stow near boilers." Owing to the present poor reputation of American tires here, those manufacturers who wish to improve their trade should be liberal in their guarantees and be willing to replace tires which prove faulty or damaged in transit. The sizes most commonly in use in Tasmania are the 880 by 120 or 125 millimeters (the last two being interchangeable with the 880 rim), 820 by 120 or 125 millimeters, 760 by 90 or 100 millimeters, and 815 by 105 millimeters.

Road Improvement for Autos in Afghanistan.

Consul-General William H. Michael, of Calcutta, furnishes the following information concerning the proposed establishment of an automobile postal service in Afghanistan:

It was reported some months ago that the Amir of Afghanistan intended to improve the roads en route from the Khyber to Kabul, in order to permit the use of automobiles. Orders have just been issued that the section from Dhakka to Jellalabad is to be taken in hand at once. The idea seems to be to establish an automobile postal service to and from Kabul, but progress is likely to be slow in this matter, as heavy expenditure will be required on the hill section between Gandamak and Buthak.

American Cars Have Large Sale in Java.

Consul B. S. Rairden, of Batavia, replying to an inquiry from an American manufacturer, has the following to say about the sale of automobiles in Java:

Within the last two years sales of automobiles have rapidly increased in Batavia and adjacent districts of the Javanese capital. The importations of automobiles in 1905 amounted to $48,000, and in 1907 to $360,000. The agent for an American automobile company reports that he sold over 100 cars in twenty months. The machine he handles sells for about $2,000. [The addresses of Batavia automobile dealers are on file in the Bureau of Manufactures.]

Large Demand for Cars in Other Countries.

Similar reports from other consular stations indicate that throughout Asia, Africa, and parts of Europe, there is a growing demand for automobiles which might readily be filled by those made in this country. Both European and Asiatic Turkey need light cars with ample power and hill climbing ability, such that will carry five people, with engines of from 15 to 20 horsepower. The best is required, however, and demonstrations must be given by operators who are able to show the quality of the cars.

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STANDARDIZATION VITALLY NECESSARY.

Standardization of automobile parts has become a most vital question, and one that now is worthy of the most conscientious attention. This is a matter that affects the owner and driver more than the factory man, because it will cost the latter much money to make changes of this sort. On the part of the buyer, however, there should be no hesitancy in demanding such reforms as standard control systems. There should not even be any necessity to call attention to this, as it is self-evident to anyone who has ever driven two different makes of cars.

In one, the forward movement of the lever on the outside gives the low speed. Get into another car, get into crowded or congested streets, and then upon involuntarily throwing the outside forward speed, instead of going slowly forward the car goes backward into another rig, and the driver, probably a very careful operator, has a bill of damages to pay. And all through no fault of his own nor through any lack of care or ability.

Then there is the matter of the spark and throttle. On one car the former is uppermost, on the next the throttle is above. In the habit of driving the former, you retard the upper lever, and when you crank the motor it throws you over into the next county. Result, doctor's bills and other expenses through no fault of your own.

Moreover, the number, location and operation of the foot pedals are worthy of standardization. When used to operating the clutch with the left foot, it is more than disappointing to apparently declutch and try to change gears, only to find that the left pedal operates the brakes. So, instead of declutching you have put on the brakes and spoiled your gears.

That the importance of this subject is partly appreciated by the buying public is apparent from the statement that one of the foremost American car builders, turning out one of, if not the finest car in the country, was obliged at the beginning of the present season, by outside pressure, to change the form and location of the gear shifting lever. The former position was a good one and the shifting arrangement was excellent, but the public would not have it. As a result, the distinctive position was abandoned in favor of the commonly accepted one.

So, too, with the progressive gearset, this was markedly simple, comparatively lower priced to construct and install. But most of the people wanted and would have the other form and it became in a sense the standard. This necessitated that many firms change their construction, which has been done to a great extent, until to-day there is but one very prominent firm using this form of gear box, and, if rumor can be believed, even that will be changed for next season.

Instances might be cited, ad infinitum, but that is unnecessary. The idea is that many of the present forms which automobile parts take should be so altered, not to be interchangeable, that would be asking too much, but to be standard so that the operation of all cars will be alike. Then, and then only, will the danger and worry, with consequent expense, be eliminated.

This millennium can only be brought about by a strong and urgent demand from the people. To make such a demand efficacious, it must be widespread or universal. Previous to that must come a full realization of its advantages and the disadvantages now existing.

* * *

THE DIFFERENCE IN THIS YEAR'S CONTESTS.

There will be races this year, there is no question about that, but there will be a decided difference and it will be apparent to even a casual observer. Racing in the past has been racing pure and simple, sport for sport's sake. The contests of to-morrow will not be races in that sense of the word, but will be more tours on the order of a modified Glidden tour, which will be useful and serve a purpose in pointing out the good, bad and indifferent forms of construction as "shown up" by many miles of running under the ordinary conditions of road, speed, wind, weather, etc.

The other form of races which will be brought before the public in the coming season will also be of a useful nature, but at the same time more on the order of races. Just as the first named class will show up defects in the course of ordinary running, so the second class will do the same under extraordinary conditions of speed, road, etc. So hill climbing contests with maximum speed prevailing, two-mile track speed races and limited road races will be in order. Just as the British Four Inch race was a very instructive one to manufacturers, by far the most instructive ever held, so similar contests, properly arranged and run, may be expected to be of equal benefit to American manufacturers. The contests of the coming and future years will be of this nature.

HIGHWAY COMMISSION HEARS ABOUT CHAINS AND NON-SKIDS

ALBANY, N. Y., April 5.—Not a single voice in favor of the prohibition of tire chains and non-skid devices was raised in the hearing before the New York State Highway Commission on Thursday last, while prominent automobilists from various parts of the State appeared in opposition to the proposed measures. By their forceful arguments it is probable that they influenced the members of the commission to allow the use of these devices with certain restrictions and regulations. Evidence was adduced showing that chains do little or no damage to road surfaces in wet weather and at the same time increase the safety of the occupants of automobiles, though it was admitted that chains and other non-skids should not be used in dry weather because of possible injury to both tire and highway.

Charles Thaddeus Terry, chairman of the legislative board of the American Automobile Association, was the principal speaker against the proposition. Mr. Terry said that tire chains and other adequate non-skidding devices are necessary for safety and careful operation of automobiles when roads are wet, slippery or covered with snow and ice and that the injury to the road from them, if any, is slight and far overcome by the necessity for public safety.

"As for the tire chain," he said, "it sinks into the tire and only slightly in the road, is easily removed and thus is used only in dry weather. There would be no objection to a statute prohibiting the use of non-skidding devices when the roads are dry, for that is the only time when they can do any damage and automobilists do not need them."

Mr. Terry said further that a prohibition against the use of tire chains in all conditions of the road would be unconstitutional and that the Supreme Court of this State had held such a restriction void; that the provisions of the New Jersey law allowing non-skidding devices only when there is an inch of snow or ice on the road had been condemned by the attorney-general of that State and had been practically repealed by the New Jersey Assembly by a large majority. "All the automobilists of the State and of the United States," he declared, "insist that a prohibition of the chain would deny to automobilists equal rights to the use of highways, because under many decisions of the court it has been held to be a natural and usual use."

Coker F. Clarkson, representing the Association of Licensed Automobile Manufacturers, said: "What is the possible injury due to the use of chains? Only a fraction of the automobiles in operation ever use chains. Those on which chains are used have them in the tool box nine-tenths of the time—probably only one day in a month are chains used for a short time. Is it possible that this small use can really be the cause of material damage to the roads? During the very small time relatively that chains are used, what happens? On the straight stretches, when running free, the wheels are in perfect rolling contact with the road. The chains are loose on the tire treads, and imbed themselves partially in the tread of the tire and partially in the road. If the road is soft, the chains will compact a small area of it. If the total area of the road could be similarly treated, it would be greatly improved. Thus, far, no objectionable feature is present in the use of chains. On the contrary, every horse that passes, every moment it is on the road, is digging into and disintegrating the road. In addition, it would be well-nigh impossible to start a car on winter roads without the use of chains."

Henry Edmund, of London, England, a member of the Institute of Civil Engineers, said that he had much experience with the use of chains abroad, that in some parts of England they are required by law because the effect of chains upon roadways was less injurious to the roads than steel-studded tires, which had been experimented with.

Others who appeared were: H. A. Meldrum, president, and Oliver A. Quayle, ex-president, New York State Automobile Association; Frank G. Webb, president, and H. G. Andrews, secretary, Long Island Automobile Club; Bert Van Tuyl, Automobile Club of Rochester; F. H. Elliott, Bronxville Automobile Club; G. H. Stillwell, Automobile Club of Syracuse; F. A. Kately, Mount Vernon Automobile Club; Albert A. Shattuck, ex-president, Automobile Club of America; George C. Diehl, engineer of Erie County; Hiram Percy Maxim, Hartford; Peter D. Kiernan, Albany; Arthur F. Phelps, Watervliet; John M. Bruce, Yonkers; Edw. M. McMahon and James Hemstreet, New York.

When the opposition, the automobilists, had finished their arguments, Chairman Hooker, of the commission, gave those who were in favor of the proposed law a chance to speak, but no one appeared. Those who attended the meeting are inclined to believe that the commission was favorably impressed with the arguments of the automobilists. The absence of any champions of abolition of non-skid devices certainly diminishes the force of their argument—if they have any.

NEW YORK INTENDS TO REGULATE AUTO SPEED

CONDITIONS in New York regarding the reckless, injudicious, and criminal use of automobiles have brought about the formation of the National Highways Protective Association, to make a determined war against the persistent speeders and joy riders who have aroused the city authorities during the past week. A number of serious and fatal accidents have been caused by automobiles operated at a speed far above that considered reasonable, and an active crusade against the automobile "hog" is the result. This is supported by automobilists, the police, the professional chauffeurs, and others vitally interested, for the stigma of the wild driving has been felt by all users of automobiles in the vicinity of the metropolis.

The newly formed association has been incorporated under the laws of the State of New York, and its particular objects stated in its articles of incorporation are:

To prevent the improper and unreasonable use of the public highways and public roads and places by the owners or users of horses, carriages, bicycles, automobiles, and all other vehicles; to enforce and protect the rights of the members of this corporation and the public in the reasonable and proper use of such public highways, public roads and places; to endeavor to secure the construction and maintenance of good roads by public authority, and in furtherance and not by way of limitation upon the objects above enumerated; to endeavor to bring about reasonable and uniform rules and regulations for the use of the public highways, roads and places throughout the United States of America; to aid in the enforcement of laws in respect thereto, and so far as may be lawful to aid in securing any such changes or modifications thereof as may be found necessary or proper.

The plans for the campaign call for the stationing of twenty men on thoroughfares, used by automobilists, who will note the numbers of cars which are speeding. Where there is sufficient evidence convictions will be pressed, and for constant offenders jail sentences will be asked. By a card index system an account of the law breakers will be kept, and after being reported to the headquarters, the owners of the cars will be notified, so that if their chauffeurs have had the cars out without permission they will be apprehended. If, on the other hand, the owners themselves have been indulging in bursts of speed, the notice may tend to prevent recurrences. It is thought that by this means joy-riding may be stopped, and one of the greatest evils wiped out, at the same time making all chauffeurs more careful.

One contention that will undoubtedly be successful will be the efforts to prevent young boys from driving horses in crowded

streets, who, it has been declared, cause nearly as many accidents as reckless automobile drivers. The safeguarding of pedestrians, and sane users of the highways, is a worthy object, and the national association has already been praised by the police authorities. The bicycle squads in the city have been reorganized, and additional men put on, until the wave of criminal driving subsides. The detectives who are put upon the trails of the guilty will be no respecters of persons, and those who usually have enough influence to "beat" their cases will find that the influence will be of no avail.

Charles S. Whitman, a former judge of the court of general sessions, has been retained as counsel, and will have charge of the prosecutions for the society. The officers are: President, Henry Clews; vice-president, A. D. Middleton; secretary, Edward C. Cornell; treasurer, Gilford Hurry. Besides these officers, the incorporators are: F. Augustus Schermerhorn, Cleveland H. Dodge, George W. Burleigh, R. Fulton Cutting, Joseph H. Coit, Frederick N. Lawrence, Everitt P. Wheeler, J. Forbes Potter, Lawson Purdy, William H. Llewellyn, Milton I. D. Einstein, Ackley S. Schuyler.

CONNECTICUT MAY HAVE A COMMISSIONER.

HARTFORD, CONN., April 5.—Legislative action regarding automobile laws is at present in a peculiar situation, for a bill has been presented providing for the appointment of a commissioner of motor vehicles, and it is stated that until this bill is either accepted or rejected the proposed automobile legislation will not be considered. Therefore affairs are at somewhat of a standstill. The commissioner, if appointed, would look after the enforcement of the present automobile law or its successor and would issue the licenses and certificates of registration. At present this is done by the Secretary of State's office. There is considerable opposition to the new measure, although automobilists are generally in favor of it. If action is taken on the commissioner matter the present law may be revised. Another amendment likely to pass is one requiring registration of autoists from other States. This is opposed, and will be fought, unless it recognizes licenses of States which reciprocate those of this commonwealth.

ILLINOIS MAY EXAMINE AND LICENSE.

CHICAGO, April 5.—Examination of and licensing of drivers of automobiles in Illinois is contemplated by Senator Dellenback, who has introduced a bill which provides for the examination and licensing of all persons driving or operating motor vehicles propelled by electricity, steam or gasoline.

If this amendment passes it will also amend the motor-vehicle act so that all cities and towns in the State will be privileged to examine drivers and also to license them. Chicago evidently anticipates favorable action on the Dellenback bill, for its city council already has passed an amendment to the revised municipal code which in addition to the examination feature also provides for each car carrying a city tag. At present this extra tag cannot be carried without violating the State law.

STATE LAW FOR GEORGIA AUTOMOBILISTS.

SAVANNAH, GA., April 5.—Automobiles in the State of Georgia will probably soon be regulated by a uniform law which is now being prepared by the Secretary of State Philip Cook. Members of the general assembly have requested the drafting of the bill, and it is expected that it will be introduced into the Legislature at its next session in June. Mr. Cook has copies of a number of Northern State laws and is endeavoring to take the best parts for use in the Georgia statute.

HEARING TO-DAY FOR NEW YORK BILLS.

ALBANY, N. Y., April 5.—It has been arranged by the chairmen of the Senate and Assembly committees on internal affairs to hold a joint session on all bills relating to automobiles in any way before their committees for Thursday next.

OVERLAND BUYS POPE-TOLEDO FACTORY.

One of the largest automobile real estate deals which has taken place in this country for some time was consummated in New York, on Tuesday of this week, when papers were signed by John M. Willys, president of the Overland Automobile Company, of Indianapolis, Ind., and Col. Albert Pope, president of the Pope Manufacturing Company, Hartford, Conn., for the purchase of the mammoth Pope-Toledo manufacturing plant, at Toledo, O.

The Pope-Toledo factory is one of the largest and best equipped automobile manufacturing plants in the United States. It comprises twenty-four buildings of modern construction, having floor space of 400,000 square feet and covering twelve acres. It contains hundreds of thousands of dollars' worth of modern machinery. With its present factories at Indianapolis and the new Pope-Toledo plant, the Overland Automobile Company will be one of the largest manufacturers of automobiles in the country. The output of the Overland concern will be practically unlimited, and the 1910 product will be broadened with a larger range of models and prices.

In speaking of the new deal, Mr. Willys says: "The growth of the Overland company has been so rapid that we were forced to look to larger quarters. While for many reasons we would like to have increased our manufacturing facilities in Indianapolis, the Pope-Toledo location is the only one in the market which meets our requirements. When we secured control of the Overland Automobile Company we knew that the concern would grow, but did not expect that it would enlarge with such rapidity and in such a short period. Between 1903 and 1908, during the experimental days of the Overland, 250 cars were sold. During 1908 more than 500 Overlands were built and delivered. With only three months of 1909 passed, 1,350 cars have been built, and to-day we are 1,500 orders behind. The success of the Overland has swept us off our feet, and we were simply forced to secure larger quarters. The headquarters of the concern will remain at Indianapolis."

BIG MARATHON VICTOR WAS A CHAUFFEUR.

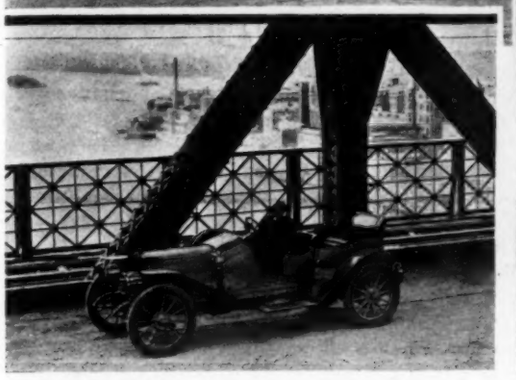
Chauffeurs may now take notice of a new road to fame, that of Marathon running on courses which take no cognizance of speed laws, for the style has been set by one Henri St. Yves. This youthful Frenchman made many thousand followers of this sport try to pronounce his name by winning the world's championship Marathon race in New York, last Saturday. It was heralded that he had been a waiter in the Hotel Cecil, in London, before coming to this country, and for that reason had given no "tips" upon his ability as a runner, inasmuch as he was in the habit of receiving only. It has developed, however, that the occupation of St. Yves was that of a chauffeur, and perhaps that accounts for his speed. His experience in his present line is a short one, covering but eight months, in which time he took prominent parts in four races in England and France, in which he scored a series of victories that have placed him in the front rank of the world's greatest runners.

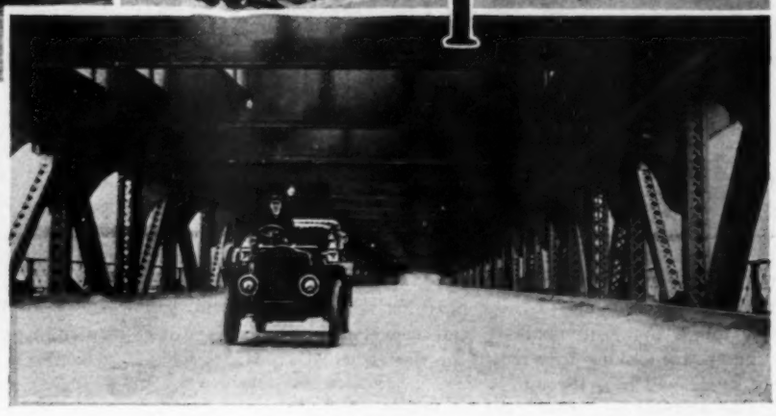
GENERAL MOTORS COMPANY PLANS.

LANSING, MICH., April 5.—It was announced to-day by W. C. Durant, of the General Motors Company, who is visiting Michigan plants, that the new main factory of the General Motors Company is to be located at Flint, instead of at Lansing, as rumored. The new building will be 1,021 by 365 feet, and will be of brick, all under one roof. It will be located near the Buick plant, and represents an investment of $1,000,000. It is estimated that 3,000 men will be employed, in addition to the 5,000 now employed by the Buick company. It is intended to have the plant completed by early Fall.

It was also stated that the output of the Olds Motor Works will be greatly increased, and perhaps new buildings will have to be constructed this spring.

How New Yorkers Can Now Reach Long Island





METROPOLITAN automobilists, through the opening recently of the new Queensboro bridge between Manhattan and her sister borough, Queens, have acquired a short route to points on famous Long Island, doing away with the necessity of a roundabout trip to the Williamsburg bridge or the use of the now obsolete ferries. The saving in time will be very appreciable, for it is possible to leave the center of the automobile district and in a few minutes enter the gates of the Queensboro bridge, without having to go through congested traffic routes.

Incidentally there was a spirited contest among automobile dealers and owners to see what car would be the first to cross the bridge. White, Lozier, Franklin and others claim the distinction. Through the courtesy of the Department of Bridges a representative of the touring bureau of the White Company was allowed the privilege of driving his steamer over several hours before the roadway was formally opened by Mayor McClellan. The purpose of the trip was to secure data for those desiring to use the new structure, as it was believed that all autoists traveling between New York and Long Island City would make early use of the new bridge instead of the Thirty-fourth street ferry. The White touring bureau then issued the following circular of routes:

The best way for New York autoists to reach the new Queensboro bridge is to go through East Fifty-seventh street to Second avenue. Here turn left into Second avenue, and two blocks beyond turn right into the driveway of the bridge. The toll for an automobile is 10 cents, as on the other bridges. There is but one driveway on the new bridge, but it occupies the middle of the structure and is at least as wide as Fifth avenue. The bridge is 1 4-10 miles long.

On reaching Long Island City side, keep straight ahead through the plaza, and at the end of the plaza turn right into Jackson avenue. Continue on Jackson avenue until one block before reaching the court house, and then turn left into Nott avenue. One hundred yards beyond, bear left again into Thompson avenue, and continue over the new viaduct spanning the Long Island railroad yard. The distance from Fifth avenue and Fifty-seventh street to Thompson avenue by the route given is 2 7-10 miles. Thompson avenue, as is well-known to most automobilists, is the thoroughfare to all the principal roads on Long Island used by tourists. On returning to New York, retrace the route given except that, in leaving the bridge, it is best to go through East Sixtieth street.

Mayor McClellan, in crossing the bridge and officially opening it, rode in a Franklin touring car, but he was preceded by several hours by ex-Chief of Police Devery in his car. The Lozier comes forth, however, with the statement from C. A. Emise, of that company, that this car was really the first over, for Mr. Emise secured a special permit to use the bridge on Monday, the day previous to the announced opening, and that he crossed twice in his Briarcliff roadster. On going over en route to Flushing the main roadway was deserted and less than two minutes were consumed in covering the distance.

MOVEMENT FOR ATLANTA-WASHINGTON ROAD.

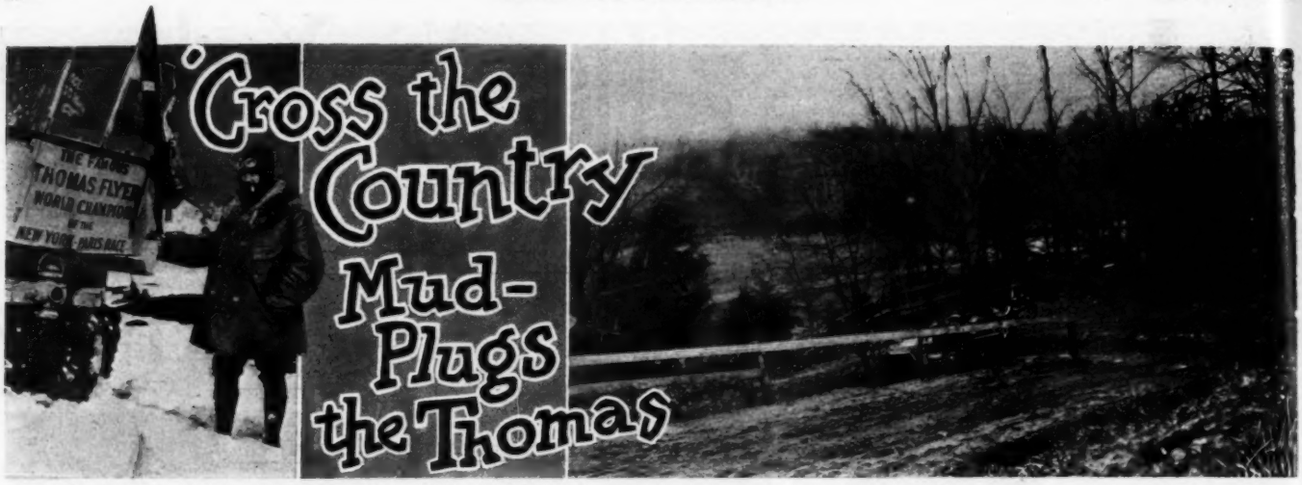
ATLANTA, GA., April 5.—Definite movements towards building a road from this city to the national capital have been started here, through the application of Frank Weldon and A. W. Smith for a charter, asking to be incorporated as the Interstate Highway Association. A capital of $1,000 is given, but the right to increase that to $100,000 is asked, and the objects of the association are stated to be several: the promotion, construction, and improvement of continuous highways from one section of the country to another; the right to organize local associations; to accept donations and contributions for the building of roads.

The principal office of the association will be in Atlanta, and it is planned to promote the road from this city to Washington before taking up those between other cities in the South.

COLUMBUS ASSOCIATION ORDERS ROAD SIGNS.

COLUMBUS, O., April 5.—The Columbus Automobile Association, which recently opened luxurious clubrooms at the Northern Hotel, has awarded a contract for the furnishing of a large number of danger and distance signs. The club will soon declare a "sign day," when they will be erected. For erection over garages twenty-five club monograms of blue have been received.

The club maintains a private secret service department, employing a detective to recover stolen machines and accessories. Since this department was founded twelve stolen cars have been recovered and also numerous other articles. There is a standing reward of $100 for the arrest and conviction of any person bothering the car of a member of the association. Another feature of the association is the information bureau.



PATHFINDING for an international contest, of the transcontinental variety, in the Middle West, is one continual round of hearty receptions and celebrations, when it is not a case of plowing through deep mud, or running over dusty roads. This has been the experience of the crew of the Thomas car, which is marking out the route to be taken by the contestants, in the endurance run from New York to Seattle next June. The pathfinder is now near Kansas City, Missouri, and has found that automobilists, and everyone else in that great country, are looking forward to the time when the participants in the event will pass through.

The Thomas left New York on March 20, reached Chicago on March 30, and left on April 1 for St. Louis. On the first day it reached Bloomington, 130 miles, running over roads that surprised the crew by their excellence, in comparison with some covered in Ohio. St. Louis was reached on Friday evening, by making the longest run of the trip, 190 miles, and the roads were found to be good, until within 20 miles of the Mound City, but there were many places where they were misleading. The big car had a triumphal entry, with a dozen other cars in line, and the general enthusiasm exhibited by everyone surpassed that seen anywhere. Saturday was taken for rest and the general interest in the contest grew apace. Business and automobile interests raised a purse of $1,000, to be given to the car which reaches St. Louis first in the run, and in the evening a banquet was given in honor of the pathfinding crew, nearly 100 members of the St. Louis Automobile Manufacturers and Dealers' Association attending, and the Postmaster, Frank Wyman, gave a letter to L. W. Redington to be delivered to the Postmaster of Seattle. Governor Hadley shook hands with the crew, as the official send-off, on Sunday morning.

Two days were allotted for the trip across the State of Missouri, to Kansas City, and daylight of the first was consumed in running to Mexico, 50 miles short of the distance it should have covered. The roads were good, but twisted and turned, so that it was hard to keep the right direction, and the car had to retrace its course several times. Other delays were caused by fractious horses, and many times the car had to stop until the equines were unhitched and taken off the road. Unwilling to lose time, the crew pushed forward to Centralia.

Kansas City would have been reached by daylight on Monday if it had not been for the turbulent condition of the Missouri River at Glascow, where there were only two means of crossing—a ferry, which could not be operated on account of the rough water, and an open railroad bridge, 100 feet above the river. George Miller looked at the latter, but the wind was so high that it was deemed best not to attempt the bumping across. As an indication of the interest shown all through the West, on Monday morning Moberly automobilists actually kidnapped the pathfinders, and made them put that town on the route, necessitating a short detour.

The river was crossed late Monday evening, and the night spent at Blackburn, about 50 miles from the river. A terrific storm forced the tourists to stop, and it turned the roads into seas of mud. On Tuesday afternoon the car reached Kansas City, having taken seven hours to travel 74 miles, the last 30 being over good rock roads, but the others were through deep mud. The trip was resumed towards Denver on Wednesday.

Two entries have been announced, a Simplex by H. B. Brosel, Jr., general manager of the Simplex Automobile Company of New York; and a Stearns by Oscar Stolp, of New York, who will be accompanied by H. Davis Webster.

NEW YORK WILL HAVE 24-HOUR RACES.

NEW YORK, April 5.—Prospects for three 24-hour track races were promulgated to-day at a meeting of the Motor Racing Association, at the Automobile Club of America, resulting in the appointment of a committee to inspect the various courses around the city, and to secure the best. This organization of metropolitan dealers held two successful round-the-clock events last fall, on the track at Brighton Beach, but the cutting up of part of this into building lots will prevent its use again. The Aqueduct and Jamaica tracks will be considered, and a programme arranged at an early date.

A. C. A. SMOKER TO CONCLUDE CARNIVAL.

NEW YORK CITY, April 5.—The Automobile Club of America has extended its hospitality to the automobile trade and will give a smoker and entertainment as the concluding feature of automobile carnival week, April 26 to May 1. At this smoker the prizes will be distributed. Carnival headquarters have been opened by Secretary W. R. Lee at 1789 Broadway.

ANOTHER TRACK MEET ASKED FOR.

BOSTON, April 5.—The contest committee of the Bay State Automobile Association has requested a sanction from the A. A. A. for a track race meeting to be held on the Readville track on June 17. Memorial Day, May 30, has in the past been the date usually selected for the spring races at Readville, but it was impossible to secure that date this year. The track has recently changed hands and improvements will not be completed in time to permit its use before June 17. The committee of the Bay State Association is headed by Dr. J. F. Hovestadt.

MAXWELL NEARING 8,000-MILE MARK.

BOSTON, April 7.—Well ahead of the 7,500 mile mark, the Maxwell four-cylinder touring car, which is running to make a 10,000 mile engine-non-stop record, is expected to cover the required distance within the week. Shortly after noon yesterday it had completed the 7,500 miles, and at noon to-day was 400 miles beyond that. It is expected to pass the 8,000 mile mark before nightfall to-day.

ADAPTING THE THREE-TON TRUCK TO FARM SERVICE

CONYERS MANOR, nine miles from Greenwich, Conn., is one of the notable estates in the East, being not merely ornamental, but a great farm operated on a commercial basis. It represents 1,300 acres of reclaimed land and is the home of E. C. Converse. Aside from being a beautiful estate, it is typical of the great advancement which has been made in modern farming, and especially in the way of applying scientific and commercial methods to agriculture. Motor cars are common at Conyers Manor. Not only is there a large and well-equipped private garage for the several pleasure cars, but there is a separate garage for commercial vehicles, which it is proposed to use extensively. The basis of work in the commercial vehicle line, now on the farm, is a Packard three-ton truck.

E. C. Converse's Packard Truck Leaving the Manor for Town.

The principal work of the truck is in running back and forth between the farm and the town. Its regular platform body has a special grain body inserted inside the regular stakes. By removing this inside body when it is not desired to haul grain to Greenwich the truck is ready for use in its other work of carrying fertilizer, coal, machinery and general supplies. Mr. Converse is an enthusiastic advocate of motor vehicles for hauling and makes no distinction between hauling in the city and in the country. He argues that with suitable roads such vehicles as this truck are particularly well adapted to farm hauling. Their greatest efficiency is in the carrying of approximately full loads for long distances, with infrequent stops. Agricultural hauling meets these requirements exactly.

For partial loads and short distances, the extra speed over the horse-drawn truck, makes up for the small load and more than compensates for the abbreviated distance. In the matter of stops, the gasoline vehicle is at no disadvantage, either, for it can be stopped in a shorter distance, and stopped or started in a shorter time than can the equal sized horse trucks. This agility, more than offsets the advantages, if any, accruing to the horse.

INCREASING USE OF THE AUTO FOR HOSPITAL SERVICE

THE illustration shows a White steamer recently put into service by the Bellevue Hospital in New York City after a prolonged trial of speed, easy riding qualities and silence, the last feature being of equal rank with the first in the final decision. This is a well-known quality of steamers and of this particular make. The advent of automobiles into this service marks another *new* departure, and a startling one, as it was freely predicted a few years ago that there was one field that the auto would never invade. This was the one in which a conquest is now being made by the car shown. There have been ambulances before this, but they have been mostly electrics, until the manufacturers of that type of car have come to look upon this field as particularly their own. The present instance shows that they are not very secure in their position and that it is time for them to look to their laurels. With the invasion of this division by the steamer as well as the electric, it would be a very hard matter to pick out anything in which some form of self-propelled vehicle is not applicable, or in which there is not a form of commercial vehicle working.

One of the New White Steamer Ambulances for Bellevue Hospital.

A Good Stretch of Pennsylvania Highway Between Lancaster and Harrisburg.

PENNSYLVANIA'S GOVERNOR GIVES TROPHY FOR CONTEST

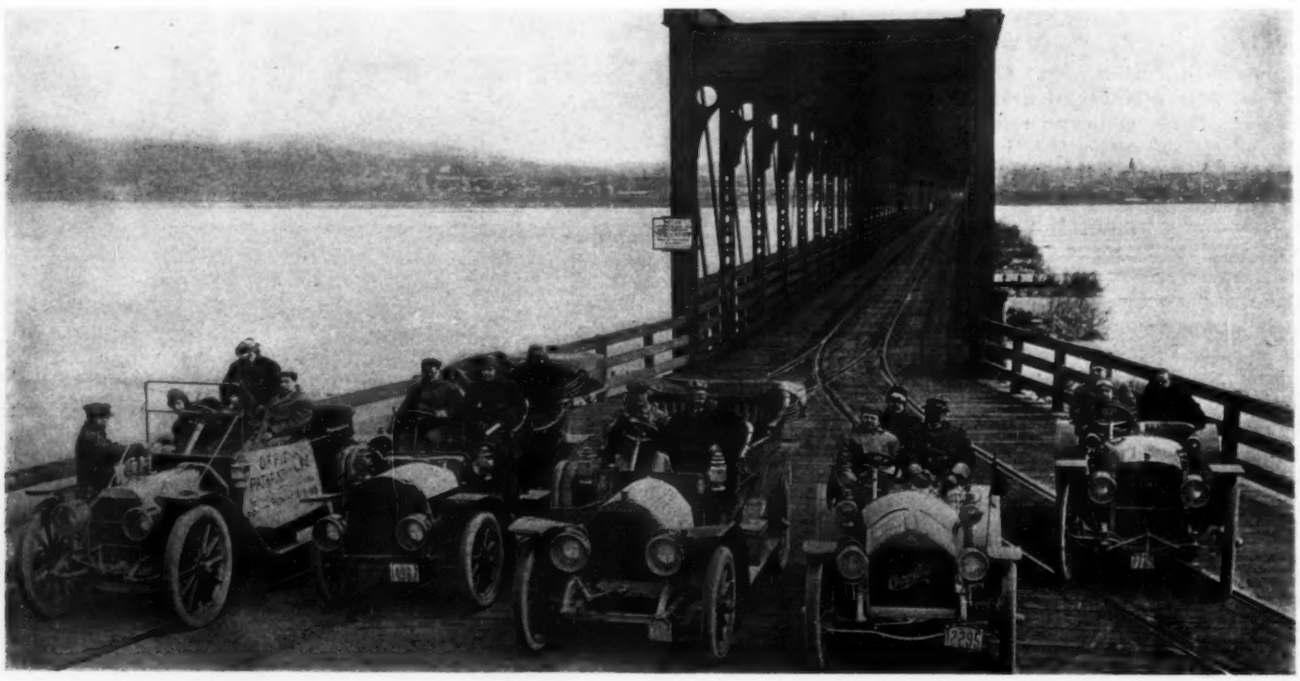
HARRISBURG, Pa., April 5.—Gubernatorial participation in automobile endurance runs is something altogether new and exceedingly pleasing to automobilists, and the Motor Club of Harrisburg is the organization which is the first to secure this honor. Governor Edwin S. Stuart, of Pennsylvania, a friend of autoists and an experienced tourist, has donated the principal trophy for the four-day endurance run of the club, to be held from May 3 to 6, and perhaps may take an active part in the first lap of the contest.

A route of about 700 miles in length has been selected, and the pathfinders have already mapped out the first half of it. The party, headed by Dr. J. R. Overpeck, of Philadelphia, last week covered the roads of the first and second day, from this city to Washington, and return. From Harrisburg the route leads to Gettysburg, where the first checking station will be established, after a short run through the battlefield. From this famous place roads through more historic country were taken, over the South Mountains, to Hagerstown, Md., where the noon control will be made. The next stretch is to Frederick, where the checking station will be but a short distance from Barbara Fritchie's house. The Cooksville route to the national capital has been selected. The checking station has been arranged for at the New Willard Hotel, on Pennsylvania avenue, where the Washington Automobile Club will give a reception in the evening.

For the second day the run will start toward Baltimore, over a road that will surprise many, for it is a beautiful boulevard, and one of the best highways in the country. The entire distance to Baltimore was especially delightful to Pennsylvanians who know what bad roads are. The entrance to the city is made through the business section, and the checking station placed at the fine quarters of the Automobile Club of Maryland, on Mt. Royal avenue. Leaving the city the route leads through Druid Hill Park to the Reisterstown pike, on a run to Westminster, thence to Littlestown, where a second control will be placed, continuing through Hanover to York, where a noon stop will be made on May 4. The next station is at Lancaster, after crossing the mile-long bridge over the Susquehanna River at Wrightsville. At Lancaster a turn is made for the final spin back to Harrisburg for the second night stop. The roads on the preliminary trip were found to be excellent everywhere.

The remainder of the route will be covered this week, going to Wilkes-Barre and Scranton, and then returning via Delaware.

In addition to the Governor's trophy, there will be a National Capital Cup, donated by the Washington automobilists.



Crossing the Columbia Bridge at Columbia, Pa., Which Is One of the Longest Railroad Bridges in the Country.

CLUBS PREPARE FOR THE SEASON'S FUNCTIONS

NORRISTOWN CLUB HAS SPLENDID HOUSE.

NORRISTOWN, PA., April 5.—After two years of meetings in hotels, or at the offices and homes of its members, the Norristown Automobile Club now has a completely equipped and furnished home of its own, situated on the Reading Pike, a mile and a half from the town, large enough to hold banquets, and at the same time so arranged as to be a cozy meeting place for a few members at a time.

The building of brick is constructed in a bungalow style, so that the second floor is really the main one, and a broad stairway leads to it from the ground. The entrance from the porches which surround it is into a large Bohemian hall, finished and furnished in Mission style, with a wide stone fireplace at one end. On the same floor, which is forty feet square, are the ladies' parlors, the governors' room, cloak room and steward's quarters. Polished hardwood floors, handsome rugs and deep window seats give a homelike appearance to the big room, while

New Home of the Norristown (Pa.) Automobile Club.

the ladies' quarters are daintily furnished. The ground floor is a big rathskeller, with its stone open hearth, polished kitchen and grill, and a room for the steam heating and pumping plant.

At the rear of the lot on which the clubhouse stands there is a temporary shed which will cover a score of cars, and it is the intention of the organization to build a permanent garage ultimately. The building itself, and the future plans, are all in the hands of the house committee composed of William B. Hart, chairman; L. E. Taubel, Andrew H. Root, Harry C. Wilson and H. C. Carney. The club is indebted for its present location to L. E. Taubel, the treasurer, who purchased the property when it was a farm, and induced the club to build upon it. A housewarming was held recently and was attended by automobilists from Philadelphia and miles around Norristown.

LOWELL PLANS TWO RACES FOR NEW COURSE.

LOWELL, MASS., April 5.--Rumors that Lowell would have another stock-car race similar to the one held here last year have been set at rest through the announcement by the Lowell Automobile Club that both a light car and a large car race will be held on a specially prepared course greater in length than the one for the previous contest as features of an automobile carnival week. The dates have been set for next September 6 to 11 and the two speed contests will be the most important happenings of that Labor Day week. At present only the preliminary arrangements are being made, but the members are ready to push the whole matter as soon as John O. Heinze, the president of the club, returns from New York.

In addition to the automobile races there will be motorcycle contests, bicycle races, motor boat races and aquatic sports upon the Merrimac River. The interest aroused by the stock-car event last year has assured the club of the substantial backing of all local influence.

ALBANY CLUB OUTLINES MOUNTAIN TOUR.

ALBANY, N. Y., April 5.—Touring for pleasure only, with no form of a contest, is the plan outlined by the committee of the Albany Automobile Club which has charge of the club's fifth annual tour. This year a route has been chosen that will undoubtedly be a favorite one, taking in some of the most picturesque parts of New England, with short daily runs and frequent stops for sight-seeing. In fact, there are no rules, and the participants may stop as often as they like. The committee requests that the club members all stop at the hotels and garages with which arrangements will be made to give minimum rates.

The tour will commence on Tuesday, June 22, with a run of 132 miles to Woodstock, Vt., covering some beautiful country through Cambridge and Salem. On the second day the run is to the Bretton Woods, 110 miles, through Lebanon, Groton, Plymouth, N. H., the Flume and Franconia Notch, passing Echo Lake. Thursday will be given over to going to the summit of Mt. Washington, and on Friday there will be a run of 116 miles to Portsmouth, N. H., through Crawford Notch and Intervale. On Saturday the run will be another short one, 64 miles, to Boston, over ideal roads and through wonderfully beautiful and historic country, skirting the shore. On Sunday the tourists will travel over Massachusetts' splendid highways to Springfield, 95 miles, stopping en route to visit the old Way Side Inn. The run of the last day is over a new and very picturesque route, following the Connecticut river northward, through Holyoke to Northampton, passing Mt. Tom, and then bearing left through Goshen, Windsor and Pittsfield to the finish at Albany. This run is 98 miles in length and the total distance to be covered in the six days of touring is 615 miles.

HUGHES NOW WILKES-BARRE PRESIDENT.

WILKES-BARRE, PA., April 5.—At the annual meeting of the Wilkes-Barre Automobile Club, held here to-night, the following officers were elected: President, James H. Hughes; vice-president, Guy W. Moore; secretary and treasurer, P. S. Ridsdale; governors, Thomas A. Wright and George W. Lewis. The racing committee having the annual hill-climbing contest on May 31 in charge will be George F. Lee, chairman; T. A. Wright, P. A. Meixell, W. E. Steelman, Dr. E. C. Wagner, Guy W. Moore and George W. Lewis.

President Hughes, in his address, advocated increased activity in good roads work, efforts to secure sane legislation for automobilists, opposition to excessive speeding and vigorously advocated building a road up the Wilkes-Barre Mountain out of the Wyoming Valley to replace the old Easton turnpike. This has an average grade of 12 per cent. and a maximum of 22, and is so steep that there have been numerous breakdowns and accidents upon it. A preliminary survey has been made for a road with an average grade of 6 per cent. and a maximum of 11, and President Hughes will work hard to get this built.

A. C. A. WILL RE-ELECT OLD OFFICERS.

NEW YORK, April 5.—The Automobile Club of America, at its annual meeting, to be held Tuesday, April 13, will re-elect all of its present officers, with the exception of the treasurer, as nominated by the board of governors. No opposition will arise, for the constitutional time limit for the proposal of another ticket has elapsed, and therefore the officers for the coming year will be:

President, Judge E. H. Gary; first vice-president, Henry Sanderson; second vice-president, William G. McAdoo; third vice-president, Robert Lee Morrell; treasurer, Alfred Ely. The three governors whose terms expire this year have been nominated to serve for three years more, constituting the class of 1913. They are Horace Porter, George F. Chamberlin and Colonel John Jacob Astor.

ACTIVE CLUBMEN OF MANITOBA.

WINNIPEG, MAN., April 5.—At the annual meeting of the Winnipeg Automobile Club the election of officers resulted as follows: Patron, Sir Daniel McMillan; honorary president, J. C. G. Armytage; president, R. M. McLeod; first vice-president, W. R. Bawlf; second vice-president, P. C. Andrews; secretary-treasurer, W. L. Wright; executive committee, E. C. Ryan, D. B. Sprague, F. R. Newman, W. C. Power, W. A. T. Sweatman, H. M. Belcher, and C. Newton.

A resolution was passed admitting women into full club membership on payment of an annual subscription of $1.

The surplus proceeds from the race meet held last fall were distributed between the various hospitals in the city, each of which benefited to the extent of $35.

The secretary reported the offer of a free site for an automobile clubhouse by a well-known real estate firm, and the offer was left in the hands of the executive committee for consideration.

Fourteen new members were elected, bringing the total close to the 200 mark. It is proposed to hold two race meets during the 1909 season, and to arrange an extended tour during the fall.

WAUSAUITES FORM WISCONSIN VALLEY CLUB.

WAUSAU, WIS., April 5.—Owners of automobiles in this place have decided to form an organization under the name of the Wisconsin Valley Automobile Club. Up to this time the owners have been content to be individual members of the Wisconsin State Association, but the number of machines is multiplying so rapidly that it has been found to be of more interest to form a separate club. It will be affiliated with the W. S. A. A. and the A. A. A. Its main purposes will be to secure legislation for good roads; to keep a check on violators of the laws, and to maintain guide posts. H. G. Flieth, cashier of the German-American bank, will probably be elected president. Neal Brown, president of the W. S. A. A., is a prominent resident of Wausau and will be a member of the local organization.

UTAH AUTOMOBILE CLUB WILL JOIN A. A. A.

SALT LAKE CITY, UTAH, April 5.—Directors of the Utah Automobile Club have decided to apply for membership in the American Automobile Association in order to bring the State organization into closer touch with national movements in automobile affairs and to hold race meets, hill climbs and tours under national sanction. At present the club is chiefly interested in the good roads work under the provisions of the recent enactment of the Legislature, by which it is hoped to establish a system of improved highways throughout the State. As soon as weather conditions become settled actual work will be commenced.

HARTFORD POSTPONES CLUBHOUSE IDEA.

HARTFORD, CONN., April 5.—It has been decided by the "new quarters" committee of the Automobile Club of Hartford to abandon temporarily the idea of securing a clubhouse and to remain at the Allyn House for the present. This will be taken up for definite action at the annual meeeting, which will be held April 14. A number of desirable locations for a clubhouse were inspected and several good offers received.

J. Howard Morse, former president of the Automobile Club, and Mrs. Morse have returned to the city after a two years' tour through Europe. After a visit they will return to Switzerland.

BERLIN, WISCONSIN, AUTOISTS ORGANIZE CLUB.

BERLIN, WIS., April 5.—The Berlin Automobile Club has effected a permanent organization and elected the following officers: President, C. M. Boettge; vice-president, T. S. Rumsey; secretary, Perry Niskern; treasurer, W. N. Crawford; executive committee, Frank H. Russell, H. Safford and Fred Wright. The headquarters will be at the Wilson Garage. The club already has a membership of 35.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Shows.

April 10-17.....Brooklyn, N. Y., Clermont Rink, First Annual Automobile Show, Long Island Automobile Club.
April 17-24.....Montreal, St. Lawrence Hall, Fourth Annual Automobile Show, auspices of Automobile Club of Canada. R. M. Jaffray, Manager.

Races, Hill Climbs, Etc.

April 22-24.....Chattanooga, Tenn., Hill Climb on Lookout Mountain, Lookout Mountain Automobile Club.
April 24.....Philadelphia, Roadability Run to Atlantic City, Quaker City Motor Club.
April 26-May 1...New York City, Second Annual Automobile Carnival, New York Automobile Trade Association.
April 26.....New York City, Second Annual Hill Climb, Fort George-New York Automobile Trade Association.
April 28-30.....Pittsburg, Pa., Gazette Times-Chronicle Telegraph Three-Day Endurance Run. Indorsed by Automobile Dealers' Association.
April 30.....New York City, Endurance Run, New York Automobile Trade Association.
May 3-6.....Harrisburg, Pa., Third Annual Endurance Run, 700 miles, Washington, Baltimore, Scranton, Motor Club of Harrisburg.
May 10-13.....Detroit, Mich., Four-day Endurance Run, Detroit Automobile Dealers' Association.
May 18-19.....Norristown, Pa., Second Annual Endurance Run, Norristown Automobile Club, to Hagerstown, Md.
May 22.....Hartford, Conn., 200-Mile Endurance Run, Hartford Automobile Club.
May 22.....Newark, N. J., Third Annual Endurance Contest, New Jersey Automobile and Motor Club, 190 Miles.
May 31.....Wilkes-Barre, Pa., Annual Hill Climb, Giants' Despair Mountain, Wilkes-Barre Automobile Club.
May 31.....Bridgeport, Conn., Annual Hill Climb, Sport Hill, Automobile Club of Bridgeport.
June 1.....New York City, Start of Transcontinental Contest to Seattle, for Alaska-Yukon-Pacific Exposition, M. Robt. Guggenheim Trophy.
June 12-14.....New York City, Catskill-Berkshire Endurance Contest, New York Automobile Trade Association.
June 14-18.....Philadelphia Reliability Run to Pittsburg and Return, Quaker City Motor Club.
June 18-19.....Chicago, Stock Chassis Race for Cobe Trophy and Light Car Race.
June 21-26.....Binghamton, N. Y., Fourth Annual Endurance Run, Albany, Boston, Hartford, Newburgh, Binghamton Automobile Club.
June 22-28.....Albany, N. Y., Fifth Annual Tour, Bretton Woods, Portsmouth, Boston, Albany Automobile Club.
June 24-26.....Montreal, Blue Bonnets Track, Race Meet. R. M. Jaffray, Manager.
June 25-26.....Philadelphia, 24-Hour Track Race, Quaker City Motor Club.
July 3 and 5.....Wildwood, N. J., Straightaway Races, Motor Club of Wildwood.
July 4.....Los Angeles, Cal., Southern California Automobile Dealers' Association. Road Races, 250 Miles for Large Cars; 150 Miles for Light Cars.
July 7.....Detroit, Start of Sixth Annual A. A. A. Tour for Glidden Trophy.
Sept. 15.....Denver, Col., Start of Flag to Flag Endurance Run to Mexico City.
Oct. 7.....Philadelphia, Second Annual Stock Chassis, 200-Mile Race, Fairmount Park, Quaker City Motor Club.
Dec. 29-30.....Philadelphia, Fourth Annual Mid-Winter Endurance Contest, Quaker City Motor Club.

FOREIGN.

Races, Hill Climbs, Etc.

April 11-18.....Austria-Hungary, Prague, Automobile Exhibition Hill Climb at Koenigsaal, Automobile Club of Tcheque.
April 22-30.....France, Paris, Small Commercial Vehicle Competition.
April 26-May 13..Germany, Commercial Vehicle Competition, Kaiserlicher Automobile Club.
April 29.....Sicily, Voiturette Races.
May 2.....Sicily, Targa Florio, Automobile Club of Italy.
May 6-9.....Austria, Small Vehicle Competition, Automobile Club of Austria.

SPEARE AT A.A.A. HELM; HOTCHKISS ON NEW JOB

BOSTON, April 6.—Lewis R. Speare, the newly elected president of the American Automobile Association, to-night was tendered a dinner by the directors of the Bay State Automobile Association, the presidency of which he recently resigned because of his increased national duties. The function was made notable by the presence of the Massachusetts Highway Commission and well-known automobilits from various parts of the State, in addition to several from outside the State.

President Lewis R. Speare.

Of course, the recipient of the honor heard many pleasant things said about him, including reference to his unselfish activities extending over a long period of years and expressions of confidence in his ability to increase the power and influence of the national body.

In the enforced absence of President-elect Tudor, of the Bay State club, Secretary Fortescue made an efficient toastmaster. The oratorical fusillade was long and varied. The members of the highway commission, Chairman Harold Parker, Col. W. D. Sohier, J. H. Manning, and Secretary A. B. Fletcher, supplied timely talk, and ex-Congressman Thomas Powers of Newton contributed the real eulogy of the center figure of the feast.

The "also spoke" list included A. B. Bliss, president Massachusetts State Automobile Association; J. O. Heinze, preident Lowell Automobile Club; W. H. Chase, president Wachusett Automobile Club; J. P. Coghlin, president Worcester Automobile Club; S. L. Haynes, ex-president Automobile Club of Springfield; F. H. Elliott, secretary American Automobile Association; Charles J. Glidden, the globe girdler; J. C. White, secretary to the mayor of Boston, who was unavoidably absent; J. H. McAlman, president of the Boston Dealers' Association; E. A. Gilmore, president pro tem of the Boston Motor Club; A. G. Batchelder, and several others added to the hilarity of the occasion.

The dinner was held at the Hotel Carlton in the recently acquired clubrooms of the Bay State Automobile Association. Songs there were by an amateur quartette of rare excellence, and songs there were in which all present joined in the singing. Concisely summed up it might be said, as is often stated in the country weekly, that "a good time was had by those present."

REFUSES TO MAKE "JOY RIDING" A LARCENY.

ALBANY, N. Y., April 6.—Assemblyman Robinson secured unanimous consent to-day to the taking up and passing the bill to make it malicious injury to property and a misdemeanor to tamper with or injure a motor vehicle, which measure was similar to the one passed through the House Monday night. At the same time Senator Hill's bill to make it larceny to take an auto for a joy ride without the owner's knowledge or consent was received and referred to the Assembly committee on codes, having passed the Senate Monday night the same time that Assemblyman Robinson passed his anti-joy ride bill through the Assembly. The Assembly bill, however, only makes the crime malicious injury. This bill also contains the anti-tampering with an auto provision, and makes that a misdemeanor as malicious injury to property or interference therewith.

It is doubtful which of the bills gets to the Governor, as the Assembly codes committee would not stand for the bill making the joy ride larceny, and the Senate may amend the Robinson bill so as to make it larceny instead of malicious injury to property.

SURCHARGED with unselfish enthusiasm for a cause, and absolutely free from obligations that might prove embarrassing to his best efforts, William H. Hotchkiss, ex-president of the Automobile Club of Buffalo and ex-president of the New York State Automobile Association, on February 1, 1907, started out to make the American Automobile Association what the majority of its organizers intended it should be—the national body of automobilists of the country. Up to that time the A. A. A. had suffered a spasmodic existence, its demise having been imminent at several periods. But the national idea—first the local clubs, then the State organizations, and finally the whole cemented with a national board of directors and officers—survived because in the belief of the majority it was correct in principle and lived despite an emaciated treasury and leaders who made slow and indifferent progress with the poor tools at hand. There were only six State associations and about seven thousand members, with dues uncollected and requests for payment ignored.

Ex-President W. H. Hotchkiss.

Then it was that the man from Buffalo appeared on the scene, took up the work the others had thrown down, and soon made it evident that a real pilot had seized the helm of the A. A. A. ship, which no longer drifted, but set sail for a definite port. Of course, Hotchkiss antagonized some with his vigorous methods, but for every one lost he added a score to the growing army of automobilists, who were beginning to appreciate what its real work should be. Clubs were born and comatose ones revived by liberal quantities of the administrative juice, State work following as a natural sequence. National boards were formed with functions that were exercised, and while the machinery at first still creaked from its intermittent periods of disuse, the persistent application of lubrication soon had even the smallest cogs in consonant operation. Overseeing the job was the tireless disciple of Blackstone, whose energy often took him into a maze of details and made some of his lieutenants feel that either he should not waste his time in side channels or else their successors should be named.

This, however, was the nature of the man, for to insure success no detail was too small for his personal attention. Results, however, tell the complete story, and when the other week Judge Hotchkiss informed the A. A. A. directors that he could not serve out his third term, he relinquished the head of a national organization that had grown to 27 State bodies and over 21,000 members. Reluctantly the resignation was accepted, for it means the loss of a man who fought for the general good of automobiling and gave to it most generously of his time, which meant services that could not have been bought by any sum within the command of the association.

Called to the important and difficult place of superintendent of insurance of New York State, the Hotchkiss thoroughness and indefatigability will soon make itself manifest. Governor Hughes made no mistake in his selection.

Wheels are to be attached to an aeroplane which W. H. Martin, of Stark County, Ohio, has invented and built. These wheels will be 1 foot in diameter, and other changes have been made in the construction, the front rudder and the frame being altered before the plans for the next flight are arranged. Mr. Martin has been in correspondence with F. S. Lahm, of Paris, regarding engines.

Pathfinding Party of 1907 A. A. A. Tour.

"Phil" Flynn in center, next to him on left are Paul C. Wolff and Dal H. Lewis; on his right, Teddy Day (hatless) and Arthur Banker (leaning on mudguard of Pierce car).

DEATH OF PHILIP S. FLINN, OF PITTSBURG.

Philip Sheridan Flinn, of Pittsburg, Pa., a well-known automobilist, died in Atlantic City, Sunday, March 28, after a long illness, a result of acute stomach trouble, which affected his heart. Mr. Flinn had been especially prominent in automobile circles in connection with the annual Glidden tours. As a member of the touring board of the A. A. A., he took an active part in the pathfinding tour for the 1907 tour, and with his Pierce car made perfect scores in both the 1906 and 1907 tours. In the 1908 tour he did not enter, but he piloted the cars from a point north of Pittsburg to the last ridge of the Allegheny Mountains, east of Bedford Springs. Mr. Flinn was 44 years old.

DEATH OF PROMINENT QUAKER AUTOIST.

PHILADELPHIA, April 5.—Ferdinand M. Johnson, chairman of the contest committee of the Quaker City Motor Club, died this morning after but two days' illness. A slight cold, from which he had apparently recovered, developed into pneumonia. It is understood that Mr. Johnson's death will in no wise affect the schedule of events he had arranged for the coming season.

The dates for the endurance run to Pittsburg and return have been changed to June 14 to 18 inclusive, the former dates, May 11-15, being close on the heels of the Harrisburg run and but a few days previous to the Norristown run. The date for the 24-hour race has also been changed—from June 11-12 to June 25-26. The Orphans' Day run is scheduled for Wednesday, June 9. Entries for the road ability run to Atlantic City on April 24 are coming in rapidly.

DINNER TO DAVID BRUCE BROWN.

Thursday evening, April 1, the yacht room at the Hotel Astor, New York City, was the scene of a banquet, at which David Bruce Brown, the young amateur, who so successfully lowered records on the McIntosh 120-horsepower Benz at the recent Daytona meet, was the guest of honor. The dinner was given by the Benz Import Company, Manager Jesse Froelich acting as host. The guests included Hugh D. McIntosh, the well-known Australian sports promoter, and owner of the car which Brown drove; C. and Levi Weingarten, E. E. Maxwell, W. P. Buckley, Charles Scharfer, Jr., Willis B. Troy, Harry Fosdick, Fred. J. Wagner, C. B. Ames, E. E. Schwartzkopf, Baron William Gienauth, Wm. R. Kass, Ernest Stoecker, C. W. W. Donnelly, T. M. Simons, J. P. Muller, W. J. McBride, Duncan Curry, William Harrison and R. F. Kelsey.

Congratulatory speeches greeted Driver Brown, Manager Froelich and Owner McIntosh after the menu had been served, all of which were gracefully acknowledged by the trio in question. A life-size portrait of the German Kaiser adorned the wall back of the banquet table, and tiny German flags and American beauty roses formed the table decorations.

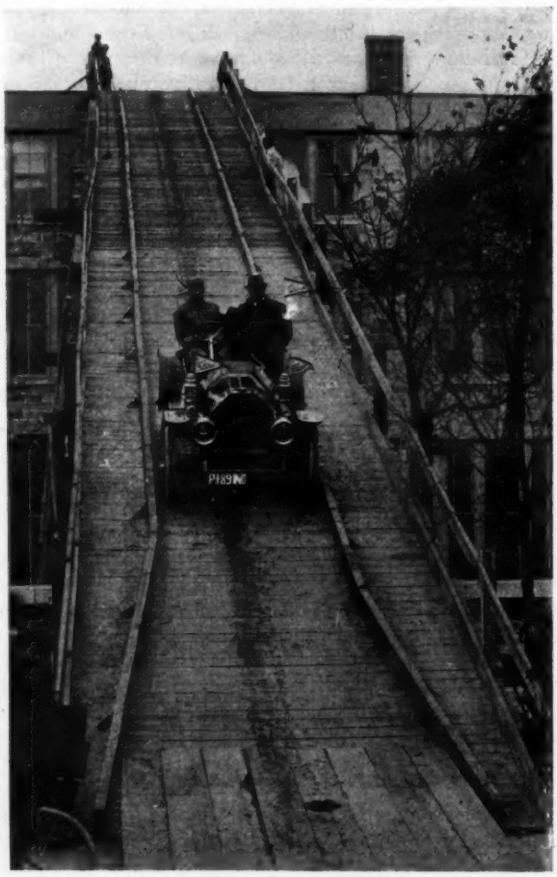
MRS. TAFT WILL DRIVE BAKER ELECTRIC.

WASHINGTON, D. C., April 5.—Mrs. William H. Taft, the "First Lady of the Land," has gone the President one better, for she will now operate her own car. She has recently placed an order for a Baker Queen Victoria electric with the Washington agent for the Baker Motor Vehicle Company, of Cleveland, and it will be delivered very shortly. The White House garage now has a White steam touring car and a Pierce gasoline limousine, so that the electric will complete the equipment of automobiles that has displaced the time-honored horse and carriage executive mansion oufits.

The car for Mrs. Taft will be the most elegantly appointed car ever built by the Baker company. It will be equipped with Exide batteries, handsomely upholstered in blue broadcloth; the coat of arms of the United States will be emblazoned on the door panels, and the interior will be noteworthy for its daintiness and refinement. That this decision of Mrs. Taft to drive her own machine will set a mark in the national capital is shown by the fact that since this was first known the Baker agents have had two requests for similar machines, one from the wife of an ambassador and one from the wife of a cabinet officer.

OVERLAND CLIMBS TO TOP OF GARAGE.

INDIANAPOLIS, IND., April 5.—Absence of hills, worthy of the name, in this vicinity makes it impossible for dealers to demonstrate the hill-climbing ability of cars which they handle. To obviate this difficulty, the Fisher Automobile Company has erected a structure from the side street to the roof of its garage, the length being 134 feet and the grade 39½ per cent. An Overland roadster made this climb in nine seconds flat, and this stunt was performed three times each day during the recent show week and always drew a crowd. The Fisher Company attributes many of the orders for 40 cars, which it took during the celebration, to this demonstration.



Overland Coming Down the Fisher Company's Artificial Hill.

Through Southern Florida in Premier "30s" with W. J. Bryan as Guest.

Michelin Starts the Racing Year Well.—At the recent speed carnival on the beach at Daytona, Fla., three new world's records were established on Michelin tires and two new world's records were secured last month at New Orleans during the Mardi Gras week contests. At Ormond David Bruce Brown won the DeWar Trophy, and established a new amateur world's record for one mile, and with the same car and Michelin equipment, he lowered the ten-mile world's record made by MacDonald on a Napier car away back in 1906. George Robertson, another Michelin enthusiast at Daytona, not to be outdone, wiped out the old five-mile records made by Lancia and Marriott in 1906 and established a new world's record for that distance. Other Michelin victories at Ormond include the one hundred mile contest for the Minneapolis Trophy; the two one hundred mile stock car events; the one mile invitation and the eight mile handicap. Michelins were again successful in all of the five laps of the interesting one hundred mile piston displacement contest, securing first, second and third place in every lap.

Immense Traffic at Franklin Factory.—As an index of industrial activity, figures are given showing the extent of the work of the traffic department of the H. H. Franklin Mfg. Co. at its automobile factory in Syracuse, N. Y. These figures show that for the past six months, constituting the first half of the present trade year, the shipments from the factory have aggregated 3,376,218 pounds. The shipments received include 2,399,477 pounds of merchandise, which with the addition of over 7,000,000 pound of coal, 1,000,000 pounds of lumber and several hundred thousand pounds of other commodities, makes a total of 11,367,675 pounds. In this period 342 freight cars loaded with Franklins have left the factory.

Times Square Automobile Company Enlarges.—The Times Square Automobile Company, of New York City, through its secretary, Jesse Froelich, has leased for a long-term of years the ground floor and basement of the property at 1591 to 1597 Broadway, at the northwest corner of Forty-eighth street. This will be added to the present quarters of the concern at 1599 and 1601 Broadway with an L to 215 and 217 West Forty-eighth street, giving it one of the largest establishments along the row. It is probable that the company will add several lines to those now conducted, chief of which will be the formation of a taxicab company, with a full line of cars.

Republic Rubber Company Opens Boston Branch.—Success in disposing of its tires in the territory around Boston, making it a principal distributing point, has obliged the Republic Rubber Company, of New York, to open its own office in that city. The branch will be located at 735 Boylston street, and a great deal of its trade will be in the staggard tread, which has proven popular there as well as in other large cities, where there are miles of smooth pavement.

Edison Company Uses an old Pierce Arrow.—After having been used continuously for five years by three different owners a 24-horsepower Pierce-Arrow has been placed in commission as a general utility car by the Edison Manufacturing Company of West Orange, N. J. The car is one manufactured in 1904. The only change made in the car was the removal of the tonneau and the substitution of a platform on which boxes and other material may be carried.

Morgan & Wright Enlarge Factory.—Building operations are now well under way at the factory of the Morgan & Wright Company, in Detroit, which when completed will increase the floor space of the plant by 20 per cent. The capacity of the factory has been taxed to fill orders, and last year it was run at night as well as day, so that additions became necessary.

Addition to Empire Tire Factory.—Empire Automobile Tire Company of Trenton, N. J., has decided to build an addition to its plant, because its trade has opened up so strongly that even by running at night as well as at day, it has been unable to care for its business.

Testing Track for Maxwell Factory.—The Maxwell-Briscoe Motor Company is having a half-mile testing track constructed at its Newcastle, Ind., factory, built of crushed stone, forty feet wide, and with curves well banked. It will cost about $3,000.

Auto Factory for Council Bluffs, Ia.—The Nevada Motor Car Company has purchased the property at Washington avenue and Main street, Council Bluffs, and will shortly commence the erection of an automobile factory, to produce drays and trucks.

Camden Reduces Speed Limit.—Camden, N. J., has had its little say, and has reduced the speed limit of automobiles to eight miles an hour, and including motorcycles in the same category. The limit was formerly very reasonable—12 miles per hour.

Fisk Company Issues Comic Posters.—The Fisk Rubber Company has issued a set of comic posters in colors, which it has sent by request to a number of automobile clubs throughout the country, attractively framed.

IN AND ABOUT THE AGENCIES.

Crawford, Philadelphia.—The Philadelphia agency for the Crawford, which until a week ago was represented in that city by the Thomas M. Twining Company, has been taken over by the Crawford Automobile Company, of Philadelphia, with headquarters at Broad and Ridge avenue.

Velie: Minneapolis, Minn.—Mich Auto Company, for local trade; Deere-Webber Company continuing with wholesale trade.

Winton and Sterling: Des Moines, Ia.—Strong Motor Car Company, 917-19 West Grand avenue.

Fritchie: Los Angeles, Cal.—Electrical Construction Company, for southern California.

Brush: Freehold, N. J.—Frank Du Bois, for the western half of Monmouth County.

Anderson, Utica, N. Y.—Bailey & Bowne, Whitesboro and Wiley streets.

Oakland: Cleveland, O.—Avenue Motor Car Company, 1806 Euclid avenue.

Matheson: Newark, N. J.—Motor Car Company of New Jersey.

Velie: Los Angeles, Cal.—Standard Motor Car Company.

Matheson: Detroit.—J. P. Schneider, State agent.

American: Trenton, N. J.—Chauncey Van Horn.

Rambler: Opelika, Ala.—Walter Greene.

Moon: New Orleans, La.—E. F. Martin.

Roe: Opelika, Ala.—C. M. Cannon.

PERSONAL TRADE MENTION.

E. Percy Noel, advertising manager of the Moon Motor Car Company, of St. Louis, in addition to writing on technical and aeronautical subjects, is also engaged in lecturing on these subjects. He has spoken on "Locomotives of the Air" before the railroad men's branch of the St. Louis Y. M. C. A., and at the central branch on "Air Travel of To-day," both illustrated.

Willie Haupt, the young Philadelphian who was so successful in hill climbs and races last season with a Great Chadwick Six, has severed his connection with

An Up-to-date Albany Salesroom.

C. S. Ransom is the distributor for the Stevens-Duryea, Lozier and Chalmers-Detroit cars at Albany, N. Y., and has a fine location at 81 Chapel street, opposite the Hotel Ten Eyck. The dimensions, 30x75 feet, afford ample space for offices, a stock of automobile supplies and quite a number of cars.

the Chadwick Engineering Company, and while at present temporarily engaged, is looking for a high-speed car, with which to enter events this year.

Godfrey G. Luthy, secretary of the Bartholomew Company, of Peoria, Ill., the manufacturers of the Glide cars, is receiving the congratulations of his many friends upon the announcement of his approaching marriage to Miss Elizabeth A. Radley, which will occur in that city, April 20.

Ernest L. Ferguson, of New York City, has been elected secretary of the Contest Board of the A. A. A. Dai H. Lewis, who has been secretary has resigned to give all of his attention to his duties as secretary of the Automobile Club of Buffalo.

W. L. Walls, who has been acting manager of the Kansas City branch of the Studebaker Company, has severed his connection with that concern, and has taken a position as manager of the Maxwell-Briscoe Company's branch in St. Louis.

H. E. Rocklege has resigned from his position as manager of the Missouri Valley Automobile Company of Kansas City, Mo., and in the future will act as traveling representative of the Maxwell-Briscoe Automobile Company, of that city.

R. W. Harroun, the inventor of the Harroun bumper, is now associated with the Factory Sales Corporation of Chicago, in a selling capacity.

OBITUARY.

Jacob Neuman.—Jacob Neuman, vice-president and general manager of the Stein Double Cushion Tire Company of Akron, O., died on March 27.

TAXICAB AND TRANSIT.

Detroit, Mich.—The newly incorporated Taxicab Service Company has arranged to use Chalmers-Detroit cabs in its service, and all will have yellow hoods as distinguishing marks. The following officers have been elected: President, T. W. Henderson; vice-president, H. G. Lyle; treasurer, Geo. King; secretary and general manager, L. S. McCreery.

Frederick, Md.—Interests in Frederick, Md., are back of an enterprise to establish an automobile stage line between that city and Emmitsburg, 22 miles distant. Fast machines to Harmony Grove, Hansonville and Mount St. Mary's College will be running by May.

RECENT INCORPORATIONS.

Kissel Motor Car Company, New York.—Capital $50,000. To manufacture horseless vehicles, motors, engines, carriages and wagons. Incorporators: F. S. Waldo, Andrew Kirkpatrick, J. G. Fitzgerald, 214 West 80th street, New York City.

William Stevenson Garage Company, Morristown, N. J.—Capital $50,000. To manufacture, repair, etc., automobiles, etc., general automobile garage business. Incorporators: William Stevenson, Annie C. Stevenson, W. W. Crane.

Armstrong Buggycar Company, Atlanta, Ga.—Capital $25,000. To buy and sell buggycars and automobiles and other vehicles, and to maintain garages. Incorporators: R. K. King, D. D. Armstrong, Thos. Scrutchin.

Originator Mfg. Company, Jersey City.—Capital, $125,000. To build automobiles and do a general merchandise business. Incorporators: V. J. Mills, New York; J. C. Inwright and B. L. Inwright, Jersey City.

Phoenix Auto & Raincoat Company, New York.—Capital $10,000. To manufacture auto and rain coats and female wearing apparel. Incorporators: Jacob and Norman Lederer and Herman Rosenberg.

American Mors Company of Illinois, Chicago.—Capital $25,000. To manufacture and deal in automobiles and other motor vehicles. Incorporators: E. W. Pottle, Rudolph Goefert, G. J. Meier.

Roy A. Faye Company, Boston.—Capital $50,000. To do a general automobile business. President, R. A. Faye; treasurer and clerk, F. D. Bennett.

Motor League of America, Syracuse, N. Y.—Capital $100,000. To manufacture motors, engines, cars and vehicles. Incorporators: A. A. Schlachter, Ernest Woods, T. A. Levy.

Pittsburg Auto Delivery Company, Camden, N. J.—Capital $125,000. To carry on an automobile delivery business. Incorporators: W. A. Pittis, A. Wood, V. A. Murray.

Pittsburg Auto Delivery Company, Pittsburg.—Capital $125,000. To construct vehicles of every kind. Incorporators: W. A. Petters, A. Wood, V. A. Murray.

Griswold Garage and Machine Co., Port Jefferson, N. Y.—Capital, $20,000. Incorporators: F. C. Griswold, L. H. Chambers, F. C. Dildene, J. B. Overton.

Aero Club of Dayton, Ohio.—Incorporators: G. W. Shroyer, Dr. L. E. Custer, G. R. Wells, F. C. Carter, P. M. Crume, William Dennick.

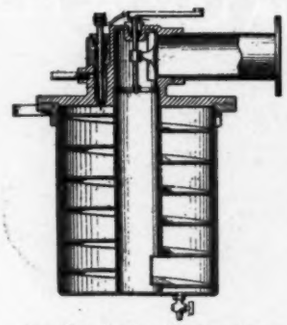
Mitchell Motor Car Company, Racine, Wis., has filed an amendment increasing its capital stock from $500,000 to $1,000,000.

SELECTED AUTO PATENTS.

Issue of March 30.

916,465. Carbureter.—Ralph L. Looby, New York City. Filed Sept. 9, 1908.

This device has an entirely new method of vaporizing the fuel, which consists of allowing it to flow down a spiral passage through which the air flows, but in the opposite or upward direction. The spiral passage surrounds a central chamber in which may be hot air, thus assisting in vaporization. The throttle valve which controls the outflow of gas is at the top, as is also the gasoline inlet. This arrangement makes the whole device exceedingly simple.



Section Looby Carbureter.

916,491. Rotary Engine Valve.—Joseph Rothschild, Bayonne, N. J. Filed Feb. 18, 1908.

916,529. Attachment for Vehicles.—Edwin F. Brown, Chicago. Filed May 6, 1907.

916,678. Automobile Tire.—Bruno R. G. Darre, New York City. Filed Nov. 9, 1908.

916,694. Spark Timer.—Herman W. Gabel, Fond du Lac, Wis. Filed Oct. 14, 1907.

916,784. Vehicle Tire.—Barton Ross, Buffalo, N. Y. Filed Sept. 24, 1907.

916,871. Spark Plug.—Gabriel P. B. Hoyt, New York City. Filed March 25, 1908.

916,888. Axle for Motor Road Vehicles.—Louis Renault, Billancourt, France. Filed Dec. 12, 1906.

Farmer Goepfert in His Rambler Inspecting Corn Bins.

At Abilene, Kan., W. H. Goepfert owns one of the largest corn farms in the State. He uses a Rambler in all his trips about the place. In the background 1,200 bushels of corn are shown in the cribs.

INFORMATION FOR AUTO USERS

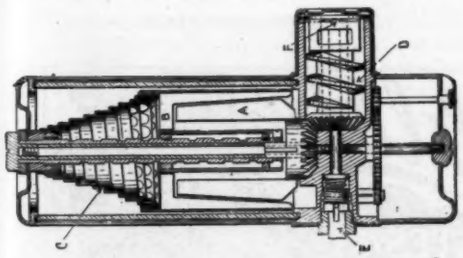
A Handy Tire Repair Kit.—A very complete and compact repair kit, suitable for repairing all makes and types of automobile tires, is manufactured and sold by the Michelin Tire Company, Milltown, N. J. This outfit, which is shown in the illustration, includes one elbow lever, one spur lever, one tube of talc, one roll of friction fabric, two tubes of Michelin patching cement in a metal

MICHELIN TIRE REPAIR KIT.

box, four red rubber patches of different sizes with beveled edges and one dummy valve. These various components are contained in a substantial and well finished wooden box with sliding cover. Several of the articles mentioned are worthy of special mention, including the Michelin elbow and spur levers, which greatly reduce the labor involved in putting in place or removing clincher tires of all types. These tools are very strong, well finished, and form a useful addition to any repair kit. The illustrated instructions that accompany the Michelin outfit show clearly the various operations in which these tools are used.

Michelin patching cement, two tubes of which are contained in this repair kit, is made of pure unadulterated dissolved Para rubber. It is one of the strongest and most satisfactory cements on the market and may be purchased in larger quantities in both tubes and cans of various sizes for private use and for garages and repair stations.

Casgrain Speedometer.—This instrument employs for its principle one of the oldest-known forces—liquid motion. A certain quantity of liquid is confined within a cylinder with absolutely no chance of escape, as the shaft connections are made above the level of the



SECTION VIEW CASGRAIN SPEEDOMETER.

liquid; and as a further precaution, the gear marked C in the sectional illustration shown, is fitted with a worm, which when revolved excludes all oil from the tubular projection, within which the only outlet is enclosed. Thus a certain amount of oil confined within a certain space, is rotated by paddles marked A, at a certain speed, thus setting up a liquid motion in suitable proportion to the speed at which paddles marked A are revolved. This current in turn, sets up a drag on paddles marked B, to which indicating dial is fixed, and it is this drag which causes indicating dial to be rotated on a spiral shaft, marked C, against a compensating spring in suitable proportion to speed at which paddles A are rotated.

By the above means the large individual figure is shown at the indicating point for every consecutive mile on the scale. The scale is 28 inches long, passing four and one-half times round a cylinder of 2⅛ inches diameter. The absence of any mechanical connection between the driving mechanism and the indicating dial, is, with the view of eliminating inaccuracy that may be caused from wear, and absolute steadiness is claimed because the liquid absorbs the vibration. Each figure on the dial is placed by hand according to individual electrical test, each figure being put in its proper location regardless of its position in relation to another. The Casgrain speedometer is manufactured by the Couch & Seeley Company, 10 Thacher street, Boston.

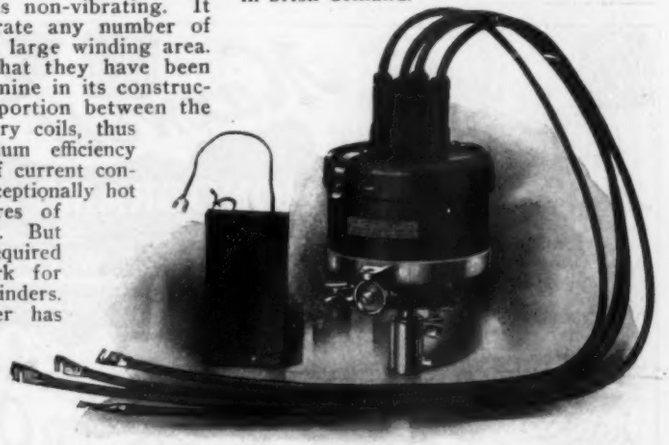
Bowser Direct Lift Garage Storage.—Gasoline has to be safely housed, and for convenience in drawing supplies from time to time, S. F. Bowser & Company (Inc.), of Fort Wayne, Ind., offer what is catalogued as the "direct-lift" system, which, however, is but one of the many Bowser plans, all of which are fully described in Bowser literature. In the direct-lift system the gasoline is stored in a steel tank under the ground and the pump is placed directly over the storage tank, thus making a low-priced, safe system for the storage of automobile gasoline. In these days when the quality of gasoline is none too good, it is necessary to conserve what is left of quality in it, and it can be done if the gasoline is removed from the package and stored in steel tanks built for the purpose.

A New and Popular Igniter.—The American Igniter, manufactured by the American Electric Fuse Company, Muskegon, Mich., is a combination of timer, coil and distributer enclosed in a single case, dust, heat and moisture proof, and so designed that it can be mounted directly on the cam or timer shaft, thus freeing the dashboard of the coil boxes and vibrators. The coil is a large and powerful one, and is non-vibrating. It is designed to operate any number of cylinders, and has a large winding area. Its makers assert that they have been able to nicely determine in its construction the proper proportion between the primary and secondary coils, thus securing the maximum efficiency with the minimum of current consumption, and an exceptionally hot spark on 2-5 amperes of current is the result. But one adjustment is required to regulate the spark for any number of cylinders. Although this igniter has been on the market for a short time, the makers have found it necessary within the last month to order approximately $10,000 worth of new machinery to care for the rapidly growing business. As will be seen, the American Igniter is a complete ignition system. The makers guarantee it to be satisfactory in every respect.

Reflex Spark Plugs.—Several new ideas in design are embodied in the spark plugs being made by the Reflex Ignition Company of Cleveland, principally dealing with the core and insulation. The plugs are of the condenser type, the steel electrode and baffle plate being machined integral, and the tip is made of an alloy which will not oxidize or warp. The insulation is double, the inner section being rolled lengthwise on the core from a thin strip of pure mica. The outer sections are simply mica washers, to act as a protection to the inner insulation, and there is no packing required, for the core is held in position by bronze seats. The nose has two ports for escaping gases, and a baffle plate, which is a new feature, inasmuch as it is claimed to keep the oil from reaching the insulation. The shell is machined from cold-rolled steel and tempered, the spark gap having a specially machined beveled rim. The plugs are made in standard, metric, A. L. A. M. and half-inch threads, and interchangeable porcelains can be furnished.

REFLEX SPARK PLUG.

Tungsten Lamps Used.—The new tungsten lamp, in which life, efficiency, and rugged service are as pronounced features, made it possible to consider electric lighting in cars as a permanent thing. Black Manufacturing Company, of Fort Wayne, Ind., taking advantage of the utility of the tungsten lamp and with a fine display of inventive faculty, completed a system of lighting for automobiles, in which the company's very efficient battery plays an important part. Then, the new "Parabolic" reflector, as here illustrated, has much to do with the success of the Black system. The company reports this system of lighting as in brisk demand.



AMERICAN IGNITER AND WIRING TO THE SPARK PLUGS.

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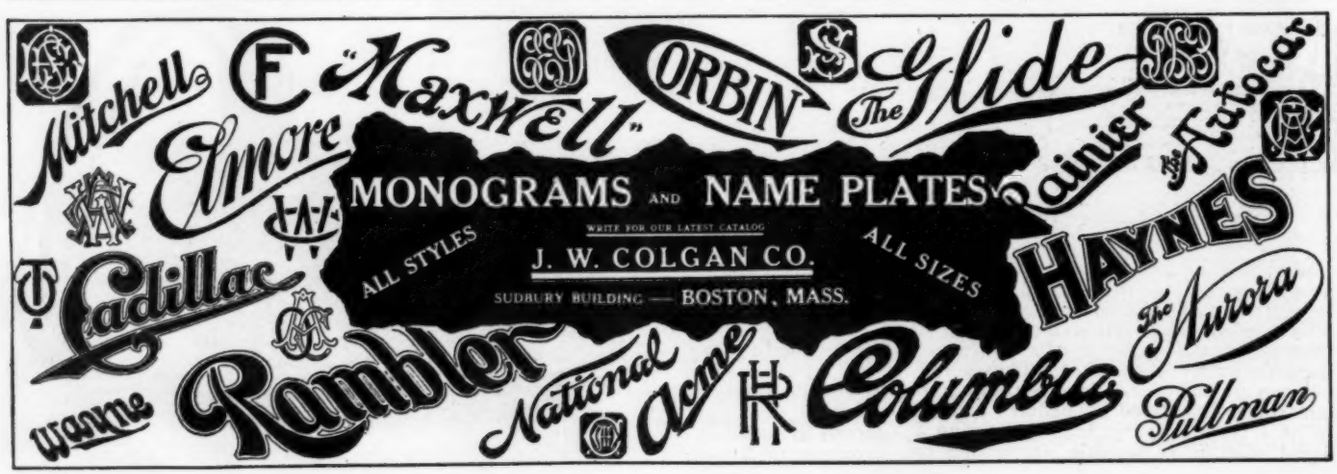
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